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U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Report of the 60th National Conference on Weights and Measures 1975

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards[1] was established by an act of Congress March 3, 1901. The Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the Nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau consists of the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Institute for Computer Sciences and Technology, and the Office for Information Programs.

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Office of Standard Reference Data — Office of Information Activities — Office of Technical Publications — Library — Office of International Relations — Office of International Standards.

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

[2] Located at Boulder, Colorado 80302.

Report of the

60th National Conference on Weights and Measures 1975

Sponsored by the National Bureau of Standards
Attended by Officials from the Various States, Counties, and Cities, and Representatives from U.S. Government, Industry, and Consumer Organizations
San Diego, California, July 13-18, 1975

Report Editor: Sandra J. Edgerly

United States Department of Commerce
Elliot L. Richardson, *Secretary*

National Bureau of Standards
Ernest Ambler, *Acting Director*

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Abstract

This is a report of the proceedings (edited) of the Sixtieth National Conference on Weights and Measures, sponsored by the National Bureau of Standards, held in San Diego, California, July 13–18, 1975, and attended by state, county, and city weights and measures officials, the Federal Government, business, industry, and consumer organizations.

Key words: Calibration; communication; consumers; grain moisture measurement; laws and regulations; measurement; metric; packaging and labeling; police radar equipment; standards; supermarket automation; weights and measures.

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REPORTS OF ANNUAL COMMITTEES

OFFICERS OF THE CONFERENCE

President: Ernest Ambler, Acting Director, National Bureau of Standards
Executive Secretary: H. F. Wollin, Chief, Office of Weights and Measures, National Bureau of Standards
Chairman: S. D. Andrews, Director, Division of Standards, Florida Department of Agriculture and Consumer Services
Vice Chairmen:
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E. Prideaux, Chief, Weights and Measures Section, Colorado Department of Agriculture
H. D. Robinson, Deputy State Sealer, Bureau of Weights and Measures, Maine Department of Agriculture
H. E. Sandel, Director, Department of Weights and Measures and Consumer Affairs, San Bernardino County, California
Treasurer: C. C. Morgan, Sealer of Weights and Measures, Gary, Indiana
Chaplain: J. H. Lewis, Chief, Weights and Measures Section, Dairy and Food Division, Washington Department of Agriculture

APPOINTED OFFICIALS

Sergeants at Arms:
D. L. Lynch, Chief, Weights and Measures Control, Department of Finance and Revenue, Kansas City, Kansas
R. A. Tharalson, Metrologist, Division of Weights and Measures, Minnesota Department of Public Service

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J. A. Etzkorn
E. Hanish
W. B. Harper
F. D. Morgan
P. E. Nichols
L. P. Romano
R. F. Schulmeister
R. A. Tharalson
E. Whitesides

(All officers of the Conference are, ex officio, members of the Executive Committee.)

(Officers and Executive Committee members elected by the 60th National Conference to serve the 61st National Conference on Weights and Measures will be found in the report of the Nominating Committee, page 234)

STANDING COMMITTEES

(The remaining term of office for each committee member, in years, is shown in parentheses.)

EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS

D. I. Offner, St. Louis, Missouri, Chairman
W. B. Harper, Birmingham, Alabama (3)
W. H. Korth, Ventura County, California (4)
S. Valtri, Philadelphia, Pennsylvania (2)
R. T. Williams (1)

(A. J. Ladd, City of Akron, Ohio, was appointed for a five–year term to replace D. I. Offner, whose term expired. Mr. Williams replaced Mr. Offner as chairman.)

LAWS AND REGULATIONS

R. L. Thompson, Maryland, Chairman (1)
J. T. Bennett, Connecticut (4)
R. M. Leach, Michigan
J. L. O'Neill, Kansas (2)
C. H. Vincent, Dallas, Texas (3)

(R. W. Probst, Wisconsin, was appointed for a five–year term to replace R. M. Leach, whose term expired. Mr. Vincent replaced Mr. Thompson as chairman.)

LIAISON WITH THE FEDERAL GOVERNMENT

W. N. Seward, American Petroleum Institute, Chairman (1)
C. G. Gehringer, Pennsylvania Scale Company (4)
L. D. Holloway, Idaho
J. F. Speer, Milk Industry Foundation (2)
E. H. Stadolnik, Massachusetts (3)

(C. H. Greene, New Mexico, was appointed for a five–year term to replace L. D. Holloway, whose term expired. Mr. Stadolnik replaced Mr. Seward as chairman.)

SPECIFICATIONS AND TOLERANCES

W. S. Watson, California, Chairman
J. R. Bird, New Jersey (4)
W. E. Czaia, Minnesota (2)
M. L. Kinlaw, North Carolina (3)
K. J. Simila, Oregon (1)

(C. Wooten, Florida, was appointed for a five–year term to replace W. S. Watson, whose term expired. Mr. Simila replaced Mr. Watson as chairman.)

SPECIAL COMMITTEE

COMMITTEE ON METRIC PLANNING

J. H. Lewis, Washington, Chairman
G. L. Johnson, Kentucky
G. E. Mattimoe, Hawaii
A. Sanders, Scale Manufacturers Association (retired)
J. F. Lyles, Virginia (ex officio)

(Members of the Committee on Liaison with the Federal Government are also members of this committee.)

ANNUAL COMMITTEE

Nominations: E. H. Black, Ventura County, California, Chairman; G. L. Johnson, Kentucky; E. Keeley, Delaware; J. H. Lewis, Washington; C. C. Morgan, Gary, Indiana; H. E. Sandel, San Bernardino County, California; C. Wooten, Florida

Resolutions: J. M. Chohamin, Middlesex County, New Jersey, Chairman; M. D. Harpster, Illinois; S. F. Hindsman, Arkansas; J. W. Jones, Riverside County, California; O. D. Mullinax, Georgia; W. C. Sullivan, Seattle, Washington; J. F. Tucker, New York

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REGISTRATIONS

Sandra J. Edgerly, Patricia A. Raschella, Sharon Shaff

LADIES' ARRANGEMENTS

Mrs. H. F. Wollin

MONDAY, JULY 14, 1975

OPEN COMMITTEE MEETINGS

Monday was set aside for meetings of the four Conference standing committees. Notices of these meetings were carried in the Conference Announcement booklet, in all pre-Conference publicity, and in the printed Conference program. Many delegates participated in the committee meetings. The discussions which took place played an important role in guiding the committees in their deliberation and preparation of their final reports. The final reports of the committees will be found beginning on page 165 and will reflect the discussion that took place and the actions taken by the Conference at the time the final reports were presented to the delegates.

MANUFACTURERS' EQUIPMENT DISPLAY

An informal display of new equipment by manufacturers was held on Monday afternoon from 4:00 to 7:00 p.m. for the education of the Conference delegates.

REPORT OF THE SIXTIETH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

MORNING SESSION—TUESDAY, JULY 15, 1975

(Sydney D. Andrews, *Chairman*, Presiding)

Mr. J. H. Lewis, Washington, the Conference Chaplain, delivered the invocation and led the delegates in the Pledge of Allegiance.

GUARDING MEASUREMENT INTEGRITY

by Sydney D. Andrews, *Conference Chairman*, Director, Division of Standards, Department of Agriculture and Consumer Services, State of Florida

Welcome to the 60th Annual National Conference on Weights and Measures. I hope all of you have come prepared to work—for there is much work to be done—and prepared to relax and enjoy this beautiful setting, when time and your other responsibilities will permit. We are especially pleased to see that so many of you have brought your families. To them we extend a special welcome. We sincerely hope it will be a profitable and enjoyable occasion for everyone.

As chairman of a conference that has such an outstanding program with so many fine speakers, I suppose I should limit myself to a few perfunctory remarks and get on with it. But, I feel so strongly about the fine work of this organization and its potential for even greater service, I beg your indulgence while I share with you a few thoughts on this subject.

First, about our theme for this year, "Guarding Measurement Integrity." I hope you will not look on it as just a catchy phrase, but as a lofty ideal and a real challenge.

For many years words have played an important part in my life, and I often find myself seeking their true meaning. For this I rely heavily on a much used volume of Webster's Unabridged Dictionary in my office. The true meaning of the word "integrity" as used in our theme intrigued me, and so once again I turned to Webster's. Here I found many definitions covering varied uses of the word, but the ones that seem to fit our theme were these:

Integrity An uncompromising adherence to a code of moral, artistic, or other values; utter sincerity, honesty, and candor; avoidance of deception, expediency, artificiality, or shallowness of any kind.

While sitting before my dictionary reading aloud these definitions of integrity, an old gentleman on the clean-up crew for our building walked in with his broom. We have developed quite a rapport over the years, and I have come to respect his homespun philosophy and wisdom. He made the remark, "Mr. Syd, I see you're at the fountain of knowledge again." I told him that I was seeking the true meaning of the word "integrity."

He smiled and said, "That's a mighty important thing, ain't it?" I agreed it was, and then I asked him, "What does the word 'integrity' mean to you?"

He paused for a moment and then replied in all sincerity, "Integrity is doing the right thing, even when there ain't nobody watching you."

I thought for a moment, then closed my dictionary and said to myself, "That's the definition I would like my friends at the National Conference to think of for the word 'integrity' as used in our theme —doing the right thing, even when there ain't nobody watching!"

Many Biblical passages admonished man to resist the temptation to cheat his fellowman. The earliest recorded history reveals laws and decrees to assure proper weight and correct measure; some of which imposed rather severe penalties on violators. Today in our country the Federal Government, every state, and many local jurisdictions have weights and measures laws and regulations to assure equity in the marketplace. But there can be no equity without integrity, so let's all rededicate ourselves to doing the right thing, even "when there ain't nobody watching."

Although I have been quite active in the National Conference for some time, it was not until serving as your chairman this year that I became fully aware of the many valuable services rendered our Conference and all its members by the Office of Weights and Measures in the National Bureau of Standards.

Their organizational support is essential and I want to gratefully acknowledge the help of Harold Wollin, chief of that office, who, as you know, serves as our executive secretary, and his entire staff.

They provide a variety of other services to the Conference and its members that enhance our performance, such as administrative, engineering and training. The latter two I would like to see greatly expanded because it not only would improve uniformity of enforcement, but would conserve tax money by having such programs developed once by a central agency with input from us all rather than each individual jurisdiction developing its own.

One additional administrative service I would like to see assumed by the Office of Weights and Measures is its acting as a focal point for information regarding deficiencies found in jurisdictions around the country. Notices regarding widespread shortages in weight, measure, or count discovered in one jurisdiction should be sent to a central point for dissemination to all jurisdictions so that sale of the short product could be stopped and appropriate action taken as quickly as possible. To me, the logical clearinghouse for this information is the Office of Weights and Measures.

But, if we want these additional services, we must be willing to help provide the funds for them. We must be willing to let our representatives in Congress know what these valuable services mean to us and urge them to support the budget request of the National Bureau of Standards on behalf of the Office of Weights and Measures. One thing is certain, it cannot provide increased services on its present budget.

To all who are concerned with integrity in weights and measures, I would urge you to consider the National Conference as the logical forum for presenting new ideas as well as strengthening old ones that are good. Producers, consumers, users, and officials at all levels of government can come together, present their views, debate the issues, and from this bring forth a consensus—something that is fair to all concerned—perhaps not exactly what anyone wanted, but a satisfactory compromise with which everyone can live.

All good laws and regulations are a compromise. You will notice I stressed "good" laws and "good" regulations. There is nothing wrong with compromising objectives, methods, and even ideas, for wisdom is never all on one side. The important thing we must guard against is that we do not compromise our principles.

During the past year there have been some critics of the actions—or perhaps I should say the inaction—of the National Conference. There have also been some defenders, and I am pleased to know that there are those who will speak out on our behalf. Actually, I am very grateful for both. Certainly, I do not want to discourage our critics. They often keep us from becoming complacent—too self-satisfied.

Those of us in regulatory work particularly should not resent criticism, for we are servants of all the people. This is especially true if it is constructive, and I choose to believe most criticism is offered in that spirit, although sometimes it is a little hard to recognize it as such. Actually, we should welcome this kind of criticism, because it often comes from people who have our interest at heart and are really trying to help us. Most of us have at least one critic. An astute man, obviously one who had lived many years with a critical spouse, once observed, "A man may be a fool and not know it—but not if he is married."

I would particularly like to take this opportunity to emphasize that we not only welcome, we strongly solicit, suggestions and constructive criticisms from our associate members. We need you. Although you are not allowed to vote on final decisions, we must have your valuable input to assure our arriving at the right decisions.

Few jurisdictions, if any, do original research or development work. There is little justification for spending the taxpayers' money in this manner. Therefore, we rely heavily on you to bring us information about new developments, especially those that warrant changes in laws or regulations. You are not "second class citizens" in this organization, and we hope you will continue to keep us informed—and on target—with your suggestions and constructive criticism.

What I have to say now probably applies more to those jurisdictions not represented at this Conference than to you delegates present, but I would like to implore all of you to become more active in a total weights and measures program. Do not be just scale testers, even though that should always be a very important part of your work; and do not continue the same old routine inspections year in and year out. Broaden your horizons; work toward becoming truly a measurement center, toward insuring integrity in every measurement made in your jurisdiction. I dare say most of us are barely scratching the surface when you stop to realize that every transaction involving the exchange of goods, property, and service is affected in a vital way by weights and measures.

I hope you have come to this Conference to learn, to take home something of value, and to put it into practice for the benefit of the citizens in your jurisdiction. This week represents the culmination of efforts on the part of many people, which began at the close of the Conference a year ago. These efforts are intended to bring forth the best possible model laws, model regulations, and handbooks on weights and measures that can be produced collectively.

After everyone has had his say, and we hope you will exercise that privilege if you have not already, we urge you to return to your respective jurisdictions and work for the implementation of these models. As all of you know, our finest works are but pieces of paper containing well intended words until enacted into law by a legislative body or promulgated as a regulation by an administrative official.

I hope our associate members are listening to this plea also, for you can be a great force in the adoption of these models. It is a political fact of life that legislators, with rare exceptions, are not influenced very much by people in regulatory work. They look on us as their employees, and we are often restricted by law as to what we can do regarding impending legislation. Mostly, lawmakers listen

to their constituents. You in the private sector really have their ear, and certainly I do not have to sell you on the value of uniformity of laws and regulations, especially those of you who operate in multiple jurisdictions.

In the final analysis, it is the ultimate consumers who pay for unwarranted uniqueness, so let us keep them in mind constantly. To you they are customers, to us they are constituents, but they are the ones who pay the bills for all of us.

Since you elected me to this great honor last year, it has been my pleasure to represent the National Conference on numerous occasions. I am sorry I could not accept every invitation I received. Especially do I regret not being able to attend all of the regional conferences. Time and a limited travel budget prevented my doing the job as I would have liked—certainly not my lack of interest in our great work.

But I did represent the Conference on more than a hundred occasions, mostly talking about the metric system, all the way from the southernmost part of Florida to as far north as Halifax, Nova Scotia, and now here we are at this beautiful spot in lower California. Incidentally, I may lose my membership in the Florida Chamber of Commerce over this. They cannot understand my allowing the National Conference to be held in California the year I was chairman!

Most of the appearances I have made as chairman have been to talk about the metric system and our role in the conversion. I feel we have a very important part to play if there is to be an orderly conversion in the marketplace, and we need to get ready.

Some industries are making much progress in converting to metric measurements. Many have a great incentive, they can show that it is profitable. I hope we in weights and measures work can help provide incentives in the marketplace for consumers. Human beings are motivated by two basic emotions—the fear of punishment and the hope of reward. I hope we never have to resort to force or punitive measures to get consumers to accept the metric system. Surely we are smart enough to offer some reward for those who voluntarily adopt the system. We need to work toward this goal.

Converting this country to the metric system of measurement is a subject which has been of great interest to me ever since the early days of my career when I was a practicing chemist; and I would like to share with you some of my thoughts about it. However, I see by the program our next speaker has selected this subject for his presentation; and because he is eminently better qualified to discuss this timely topic, I will forego my desire and close now so as not to impose on his subject or his time.

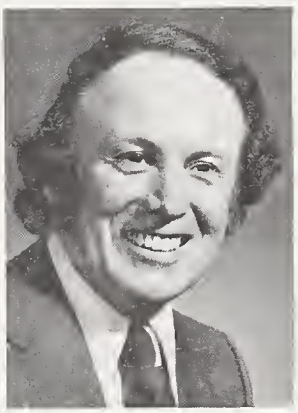
In conclusion, let me again thank you for the great honor and privilege of serving as your chairman this year. It is an experience I will always cherish. Please forgive me for waxing poetic on this occasion, but I would like to leave you with a thought expressed by the great bard, William Shakespeare, in his play "Hamlet":

> This above all; To thine own self be true, and
> it must follow, as the night the day, thou canst
> not be false to any man.

Well, just as surely as night follows day, if we will collectively dedicate ourselves to "Guarding Measurement Integrity"—doing what's right even when there ain't nobody watching—we will provide the necessary climate in the marketplace so "That Equity May Prevail."

PREPARING FOR A METRIC AMERICA

by Dr. F. Karl Willenbrock, Director, Institute for Applied Technology, National Bureau of Standards



America is going metric. It may be years before Miss America measures 91–66–91 or a new Hank Aaron hits an overpowering 109-meter home run. But, inevitably and irreversibly, the metric system is coming to the United States.

Radio announcers, supermarkets, beverage bottlers, and ballpark scoreboards are hastening the everyday use of meters, liters, and grams. As an entrepreneur in the State of Illinois puts it on a lapel button, "Take Me To Your Liter!" And a well-known soft drink company has for a slogan: "A Quart and Liter But More." The punsters have gone metric already.

There is no doubt that industrial America is on its way. As giants such as IBM and General Motors convert to metric usage, so must thousands of their smaller manufacturers. As more metric products appear in the market, every consumer must become familiar with metric measurements. The school systems in over 40 States are teaching metric; others are planning to do so in the near future. Many Federal agencies are using metric units and others are ready to go metric. Metric bills have been introduced in 13 States, and in Massachusetts and Minnesota laws have been enacted to guide the metrication process.

Within the Federal Government, progress has not been as rapid as we wished, but there is some. I would like to tell you about that

progress by reviewing some of the history of metrication in the United States.

In 1866, Congress made the metric system legal in the United States. In the same year, Congress directed that each of the States be supplied with metric weights and measures. In 1875, exactly 100 years ago, the United States was one of the 17 nations that signed the Treaty of the Meter. The 17 signers agreed to recognize the metric system as the international system of measurement. In fact, it was in late May of this year that the 100th anniversary of the Treaty was observed in Paris. The celebration was attended by the representatives of the 43 nations now adhering to the Treaty. The National Bureau of Standards was the official representative of the United States. The director and deputy director, Dick Roberts and Ernest Ambler, represented NBS.

Incidentally, for those of you who may not already know, on June 30, Dick Roberts, director of the National Bureau of Standards, succumbed to other agency pressures and became the assistant administrator for nuclear energy of the recently-established Energy Research and Development Administration. I know that all of you join me and the rest of NBS in wishing him well in this new position.

Although it has been 82 years since the prototype meter and prototype kilogram were declared to be the United States fundamental standards of length and weight, it is amazing, in retrospect, that none of these official actions of the previous century resulted in an appreciable increase in the use of the metric system in the United States. The reason is easy to discern. It was simply not considered economically feasible for our country to change, on a major scale, to the metric system. United States industry felt that the costs and inconveniences of a changeover would greatly exceed the benefits and advantages that might accrue. This evaluation persisted until the past 10 years.

However, the picture has changed markedly over the last decade. The 1965 decision of the United Kingdom to convert to the metric system, followed closely by the same decision by the other members of the British Commonwealth, made it obvious that the United States would soon become a non-metric island in a metric world. In 1968, the Congress passed an act authorizing the Secretary of Commerce to study the advantages and disadvantages of increased use of the metric system in the United States.

This three-year study, delegated to the National Bureau of Standards by the Secretary of Commerce, culminated in 1971 with a Report to Congress entitled "A Metric America—A Decision Whose Time Has Come." In brief, the Report found that (1) metric use was increasing in the United States, that (2) American industry believed

that conversion to the metric system would be in the best interests of the United States, and that (3) both the public and private sectors in the United States felt that any changeover to metric should be done through a coordinated national program. That Report also contained a picture entitled "Islands in a Metric World." In this map, the United States shared with such highly industralized countries as Sierra Leone, Tonga, and the Barbados the distinction of being one of the several non-metric countries in the world. Since that time, however, most of these countries have converted to the metric system. The United States now shares with Burma, Liberia, Yemen, and Bruni, a miniscule section of the Island of Borneo, the dubious distinction of being the only non-metric countries remaining in the world today.

Currently, the most rapid metric changeover in America is taking place in industry and in education. In industry, the manufacturers of construction and agricultural equipment, automobiles, and computers are rapidly increasing their metric use. These manufacturers include many of the largest multinational companies.

In education, the secondary schools are teaching metric education. The metric education law of August 1974 provided an impetus. This law states that it is "the policy of the United States to encourage educational agencies and institutions to prepare students to use the metric system of measurement with ease and facility as a part of the regular education program." Some children find the challenge of learning the metric system exciting; others are not quite as enthusiastic.

Each letter we receive, no matter what the source, gets personal attention. To letters from school children, we respond that the change to metric in the United States has already started and that the schools are beginning to teach metric. We also explain that the metric system is actually a simpler system to use and that once it is learned, measurements and calculations will be easier than they now are. Such letters—and NBS responds to about 50,000 letters per year on metric questions—show the impact of the metric education law.

Similarly, a metric conversion law passed by the Congress would increase the awareness that a national changeover to metric is in progress. Enactment of such a law would undoubtedly serve as a catalyst for initiating or increasing metric use in both the public and private sectors.

The enactment of metric conversion legislation will be of great importance in speeding the current voluntary course that metrication is now taking in our country. Congress is aware of this trend and almost 10 metric conversion bills have been introduced into the present Congress. One of these bills was prepared by the Administration.

For the most part, the bills are quite similar. They have two key provisions. First, they declare that the Nation's metrication policy is to plan and coordinate the increasing use of the metric system of measurement in the United States. Second, they create a National Metric Conversion Board to coordinate the various metric conversion programs in the United States. The House Committee on Science and Technology recently conducted extensive hearings on these bills and approved, with amendments, the Administration bill. The Administration's bill is currently awaiting action by the House Rules Committee before it goes before the full House.

It is interesting to note that labor unions and small businesses who were opposed to last year's metric conversion bill have indicated that they are not opposed to this bill. As a result, the enactment of metric conversion legislation by this Congress is possible. If the bill is enacted, a more direct challenge will be presented to the educational system of this country, a challenge to industry, and a challenge to each of us.

One of the most exciting opportunities is in the field of consumer products. Here Federal, State, and local governments have important roles to play. As manufactured articles incorporate more and more metric-designed components, the impact of metrication on the consumer will be increasingly felt. During this period, both opportunities and challenges will surface which need to be recognized and responded to.

Converting weighing and measuring devices is one of these challenges. You can use the time between now and M day, the day when the United States is predominantly metric, to advantage. Wherever possible, new measuring devices should be equipped with adapters so that the devices can be quickly and inexpensively converted on M day. Techniques should also be developed to adapt all existing measuring devices to metric.

In this area, weights and measures officials have a tremendous opportunity for public service. You have close contact with both the makers and purchasers of weighing and measuring devices. Do them a favor—especially the purchasers. Use all of your communication channels to alert them to the need for preparing for M day in the most efficient and cost-effective manner. For them to continue purchasing weighing and measuring devices without metric conversion adaptability is not sensible or advisable. Your contacts with manufacturers of weighing and measuring devices give you the opportunity to convey to the suppliers the need for conversion adaptability. In fairness to the purchaser, such equipment should have a dual capability.

As for the consumers themselves, a public education effort using all available media should be undertaken in the period between now

and M day. This effort should be directed toward helping the consumer understand why the Nation is converting. Assure him that what he will need to know about the new measurement units can be learned readily. Also, assure the consumer that you have his interests at heart. Make plans to protect the consumer during the conversion period. And make the consumer aware of your plans.

Let's discuss an important feature of the legislation that is presently being considered by the Congress; namely, the proposed Metric Conversion Board. Whether the Board will be attached to any present Department or whether it will be independent of them all is yet to be decided. But we can say that no matter which Federal agency has the responsibility for coordinating metric conversion that NBS will assist in any way it can. NBS is well-qualified to respond to the technical questions about the International System of Units, or SI as it is called throughout the world. Upon request, NBS will consult with the Board regarding the basic principles upon which metrication should be based. NBS, through its Office of Weights and Measures, will cooperate with the State weights and measures officials to assist them in making the transition to metric smoothly and effectively.

The role we anticipate for the National Bureau of Standards is to provide technical assistance to the proposed Metric Conversion Board to clarify the SI system of measurement. It can also use its many communications links to other governmental groups and to the private sector to assist in the solution of metric conversion problems.

Certainly, the Federal Government will have other concerns. The Federal Government, in itself, influences a sizable part of the economy. As part of the Metric Study, NBS did a survey of all civilian Federal Government agencies. These agencies reported that the long-term advantage to the Federal agencies of the change to metric would clearly outweigh any short-term disadvantages—including the costs of the change. In this respect, then, the civilian Federal agencies feel the same as many of the private industries.

One area of responsibility deserves special mention at this Conference: commercial weights and measures, which are of particular concern to you. At some point during a planned national metrication effort, commercial weights and measures will have to be changed to metric units. The changeover will include not only the commercial weighing and measuring equipment and labeling of packaged commodities, but also the establishment of standard package quantities under the antiproliferation provisions of the Fair Packaging and Labeling Act. These activities will need to be logically planned and coordinated with this National Conference on Weights and Measures.

Existing legislation that imposes restrictions on the use of the metric system, whether at the Federal, State, or local level, will have

to be ferreted out and remedial action recommended to the appropriate legislative bodies. This will require the joint effort of Federal, State, and local governments and of the proposed National Board.

Over the past few years, the National Bureau of Standards has played an important role in the guidance, coordination, and dissemination of metric information. Although NBS performs these services for the entire Nation, we particularly look forward to cooperating with you in the metrication tasks that will confront the weights and measures officials. Now is the time to anticipate those tasks and plan how to face them. Specific areas to which you can contribute are:

The identification of State and local laws and regulations related to weights that need to be amended, such as those for a loaf of bread.

Testing equipment that you use in the field needs to be evaluated to see if they can be adapted for metric use.

The development of metric training materials for weights and measures officials and for the general public.

The changeover to metric in our country should be a national, cooperative effort. Although U.S. industry will undoubtedly bear the major burden of the changeover, important roles will be played by the Federal, State, and local governments. At the State and local levels, the National Conference on Weights and Measures has an extremely challenging role to play and I am confident that you will meet the challenge. Let me assure you that NBS will provide as much assistance as possible. We hope that if and when conversion does come we will be able to increase the level of support that the Office of Weights and Measures provides the Nation's weights and measures officials. However, it would be premature for me to make such a commitment before the Congress has determined national policy in regard to metrication.

It is now my privilege to announce the names of the people who have been appointed to serve on the four standing committees. All of these people have had considerable experience in the weights and measures field and will be able to contribute significantly to the work of the standing committees.

The term for each outgoing member has expired and each new appointee will serve a five-year term. The new appointees are:

Committee on Specifications and Tolerances:

Mr. Council Wooten, Chief of the Bureau of Weights and Measures, State of Florida, replaces Mr. Walter S. Watson.

Committee on Laws and Regulations:

Mr. Robert W. Probst, Director of the Bureau of Standards, State of Wisconsin, replaces Mr. Ronald M. Leach.

Committee on Education, Administration, and Consumer Affairs:

Mr. Anthony J. Ladd, Superintendent of the Division of Weights and Measures, Consumer Protection, City of Akron, Ohio, replaces Mr. Daniel I. Offner.

Committee on Liaison with the Federal Government:

Dr. Charles H. Greene, Chief of the Division of Markets, Weights and Measures, State of New Mexico, replaces Mr. Lyman D. Holloway.

In behalf of the Conference, I would like to express our appreciation to all committee members, and especially the outgoing members, for their important work and loyal service to the Conference.

PRESENTATION OF HONOR AWARDS

Dr. Willenbrock presented Honor Awards to members of the Conference who, by attending the 59th Conference in 1974, reached one of the five attendance categories for which recognition is made—attendance at 10, 15, 20, 25, or 30 meetings.

Award Recipients

30 Years	
Robert D. Thompson	U.S. Department of Agriculture
25 Years	
W. A. Scheurer	H. J. Fuller and Sons
20 Years	
C. G. Gehringer	Pennsylvania Scale Company
John G. Gustafson	Minneapolis, Minnesota
Richard N. Smith	National Bureau of Standards
Donald H. Williams	Dairy and Food Industries Supply Association
Harold F. Wollin	National Bureau of Standards
15 Years	
Richard J. Boney	Trenton, New Jersey
George S. Franks	Cumberland County, New Jersey
Marion Kinlaw	North Carolina
Charles H. Oakley	U.S. Department of Agriculture
10 Years	
J. Clair Boyd	Iowa
Nicholas DiMarco	Cumberland County, New Jersey
David K. Forbes	District of Columbia
John W. Hale	Phillips Petroleum Company
Harry K. Johnson	National Bureau of Standards
Charles W. Moore	Madison County, Indiana
Daniel I. Offner	St. Louis, Missouri
Richard Southers	American Petroleum Institute
Richard L. Thompson	Maryland
Robert W. Walker	Clark County, Indiana
Otto K. Warnlof	National Bureau of Standards
Robert T. Williams	Texas

PETROLEUM—ENGINEERING, MEASUREMENT, MARKETING

by Dr. Joseph Byrne, Vice President, Marketing,
Union Oil Company of California, Los Angeles, California

I appreciated Syd Andrews' introduction this morning and his definition of the word integrity. It made me reflect on what I had done in coming to make a presentation to this Conference, because I first accepted this with a notion to talk to you about some of the things the new role of energy would do to your interests and your activities. But without anybody watching, I decided that I would abandon that technique and talk to you this morning about something I feel strongly about. That is the international complexity that oil brings to the world; also to give you some background or some perspective—some of my perspective at least—on the issues that face this country in trying to reach a national policy on energy.

I did not write out my speech ahead of time because I felt it would probably change before the hour of this meeting. In fact, I very carefully took forty-five minutes this morning to read the newspaper to determine what the latest steps in national policy really are. As those of you who read the morning paper know, the President has proposed a new program for decontrol of crude oil prices. The Congress is already making noise like it is not going to accept his proposal, and in effect will veto it. The Congress has yet to pass an extension of the Emergency Petroleum Allocation Act of 1973, and that Act expires on August 31 of this year if no extension is made. I really doubt that anyone can stand here this morning and predict where we are going to be sixty days from now in a national energy policy.

That is really the way the American system works; we take time, we debate, we tug and we pull. Yet, we do need a national policy on energy and the purpose of my talk this morning is to give you some perspective and background of why I think that is so important.

Figure 1 is a projection of world energy consumption. It starts in 1970 and goes to the year 2000. It shows the United States in 1970 using about one-third of the world's energy, and in the year 2000 with about 22 percent of the world's consumption, saying that the rest of the world grows faster than we will.

Incidentally, I will use barrels of oil as an energy equivalent measure. This is millions of barrels daily of crude oil equivalent.

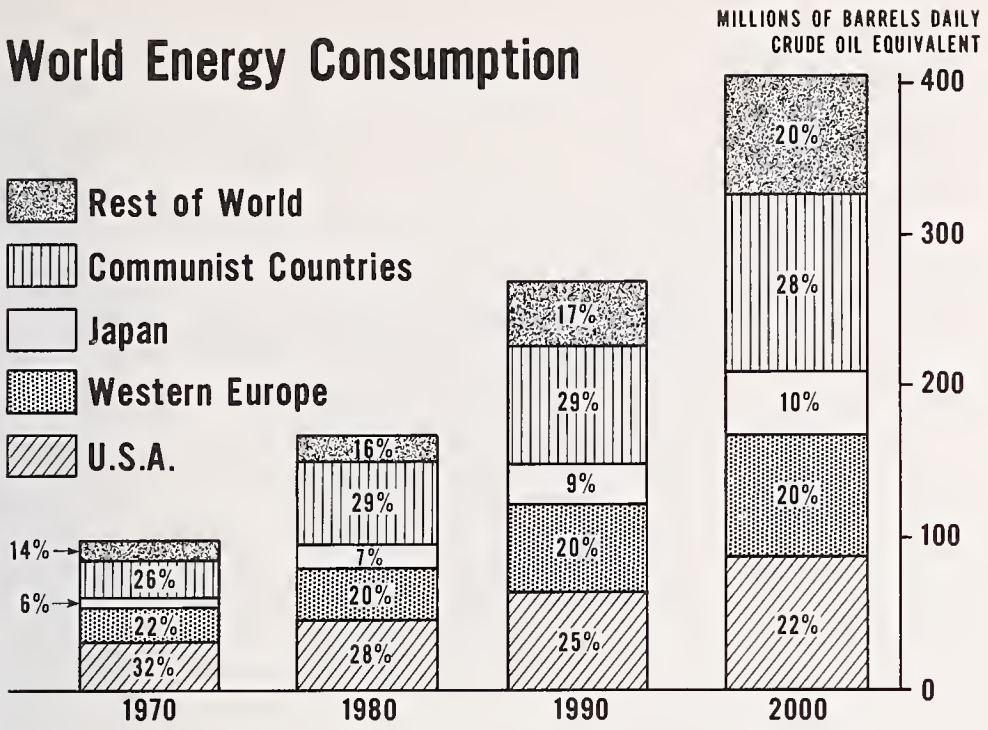


FIGURE 1

Having heard a discussion on the metric system this morning, I realize we use a petroleum barrel of 42 gallons. The gallon, of course, is an archaic unit of measurement, but it is engrained in the petroleum way of life and we have 42 gallons of energy equivalent here today.

This forecast of a quadrupling of energy use in the world was based on the price patterns of the early seventies. Undoubtedly, use will trim downward some as time goes on; but this is not just a frivolous waste of energy that is forecast. It is based on a very fundamental issue in the world picture.

Figure 2, using 1970 data, depicts a comparison of standard of living in dollars per capita on the left, with energy consumption in barrels of oil equivalent on the right. The United States in 1970 led the list in standard of living and in use of energy.

There are those who quarrel with me when I put up this figure and say you do not have to use great quantities of energy to have a high standard of living; that it does not mean that the more energy you use, the higher the standard of living. I agree there is a certain amount of waste that can be trimmed out; there is a good deal of conservation that can be made. The basic principle is that we do need energy to increase the standard of living. The great American farms of this country certainly could not do what they do without the energy behind them; nor could the great factories of our country do the things that they do without energy; nor could we live as comfortably as we do without energy.

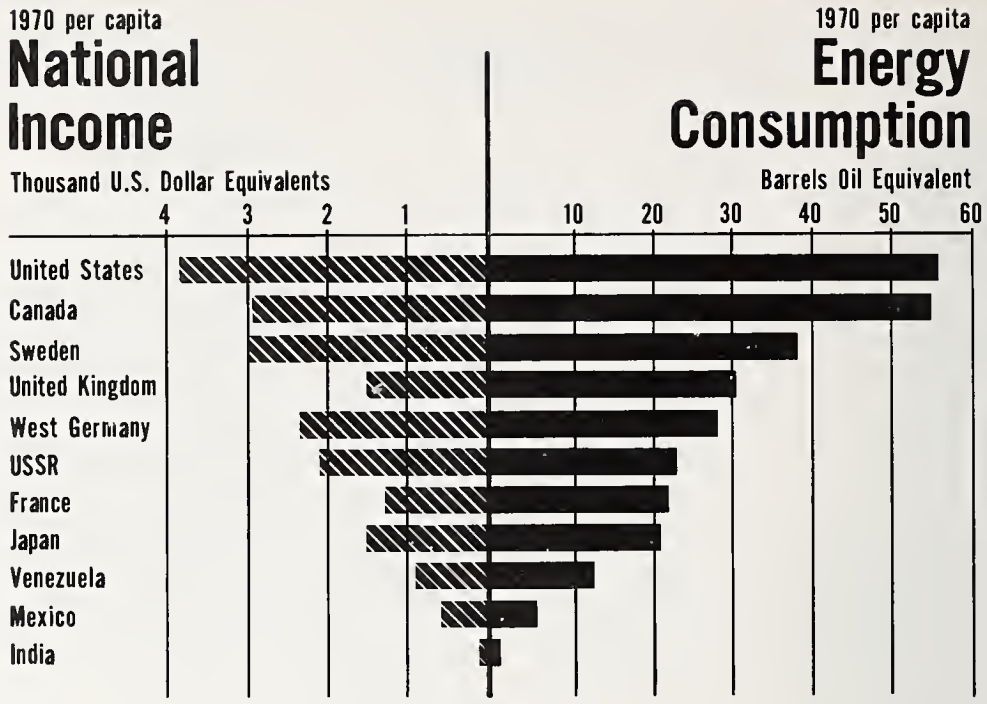


FIGURE 2

The fact is that the world as a whole has aspirations of increasing its standard of living. Our national policy is to encourage them to do so. If they do, we are going to see the world energy consumption grow very rapidly.

Since there is a limited amount of energy, and since the rest of the world is going to grow very rapidly, there is obviously going to be a great deal of tussle and pull in order to get the energy for various countries. This is the basic driving force that we will see in the next twenty years in the energy field.

If we look at the various countries (figure 3), the various sections of the world rather, and how they depend on foreign energy, we take three areas: on the left, the United States; the center of this chart, Western Europe; and on the right, Japan. We look at the red part of the bars being indigenous energy and the orange part of the bars as being that which is imported. The United States started in 1970 practically independent of world energy with very small imports. Western Europe was about 50 percent independent at the beginning of this period. Growing in its indigenous supply at the end of the period, it is projected by 1990 to still have a very significant level of imports. In the Western Pacific, Japan started the decade at 1970 about 95 percent dependent on foreign energy and is projected to end the year 1990 about 85 percent dependent on foreign energy.

Obviously, these three areas of the world are going to have different approaches to the energy problems, and the force in this country

ENERGY DEMAND VS. DOMESTIC SUPPLY

Millions of barrels daily - crude oil equivalent

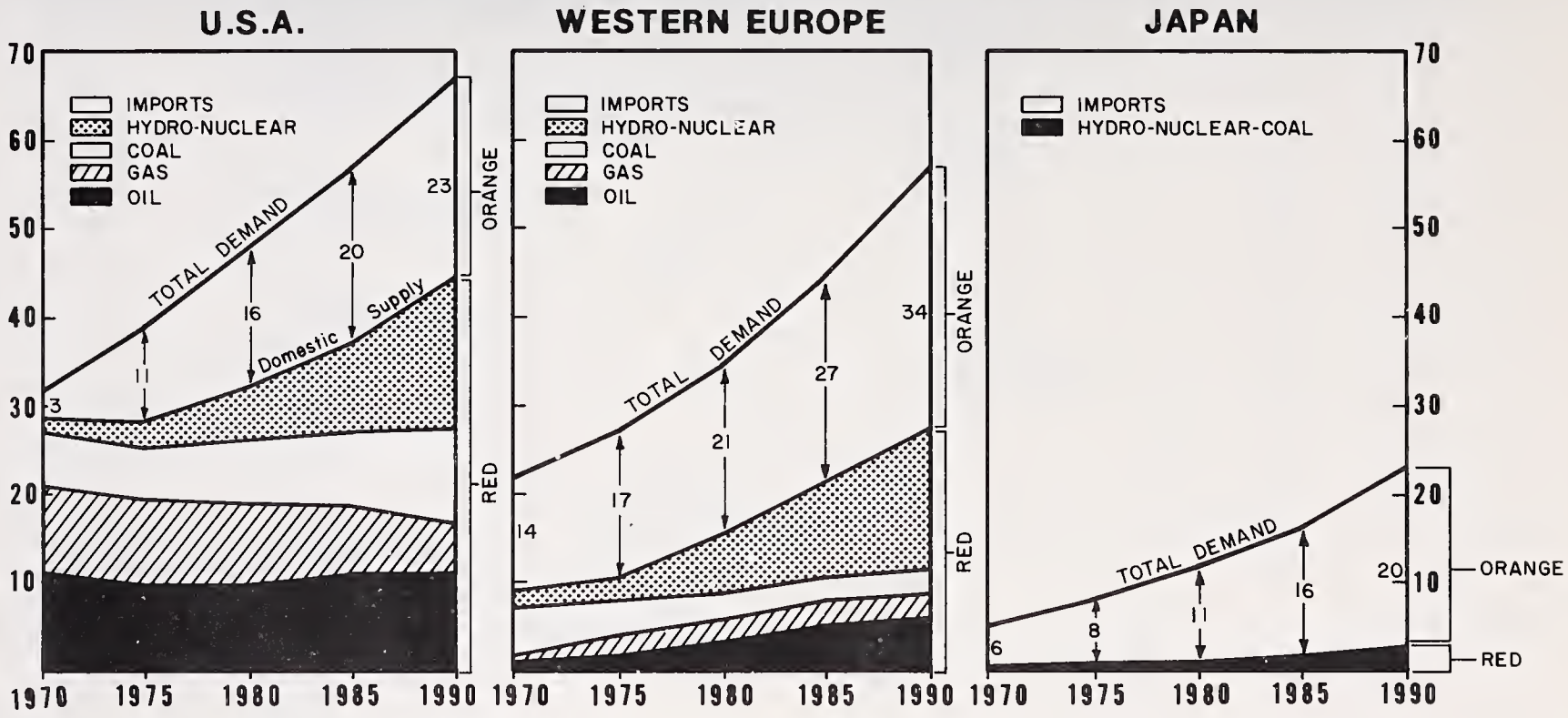


FIGURE 3

is to say let us go back and try to regain the 1970 position when we were essentially independent of the world energy supply.

In this chart (figure 4) the bars above the line show who uses the oil in the world; the solid bars below the line are the reserves. The upper bars are oil used since Colonel Drake discovered that oil well in Pennsylvania in 1859, and I guess we have to have an aside for a moment.

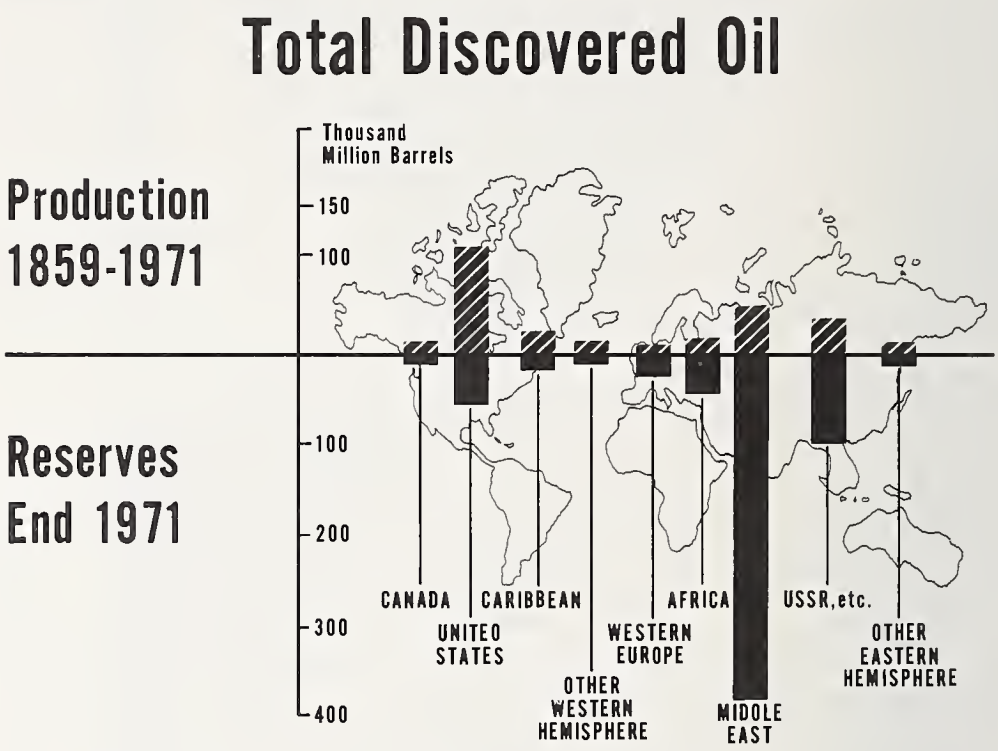


FIGURE 4

In the 1850's there was an energy crisis. The whale oil that was used for lighting and as a lubricant was running out of supply. The whales were disappearing and the whalers were having to go farther for them. There was talk in this country of no illumination; energy was going to be gone and the world was going to quit. But Colonel Drake found a well in Pennsylvania and it just produced beautiful kerosene. If he had found a well in California, it would not have made kerosene, but he found the right kind of oil! The energy crisis of the 1850's was solved very simply. I do not think we will solve it that simply in the 1970's, but that was the beginning of the oil business—Colonel Drake, 1859.

North America has been the big energy user for more than 100 years since oil was discovered, but the reserves lie in the Middle East. Russia has big reserves and third in rank is the United States. China is an unknown in this chart. We do not know how much reserves China really has found, nor do we know how much potential she has.

In world oil order, until a year ago, the United States was the world's leading oil producer. We have now, I believe the statistics will confirm, been passed by Russia. We will soon be passed by Saudi Arabia in production. But the reserves are in the Middle East.

Let us switch to the thing in the news about oil imports—who has been importing the oil in dollars. Of course, the United States leads the list with $24 billion in 1974, followed by Japan, West Germany, France, the United Kingdom, and on to Spain as the lowest on this chart (figure 5). But those are the dollars in total. Let us look for a moment at dollars per capita (figure 6). When we look at it that way, the United States falls to sixth position with $118 per person, while West Germany leads the pack at $191. France is at $185; the United Kingdom, $154; Spain, which was very low on the previous chart, is up to $73. On a per capita basis then, there are many countries in the world that were impacted greater via the world oil price than the United States.

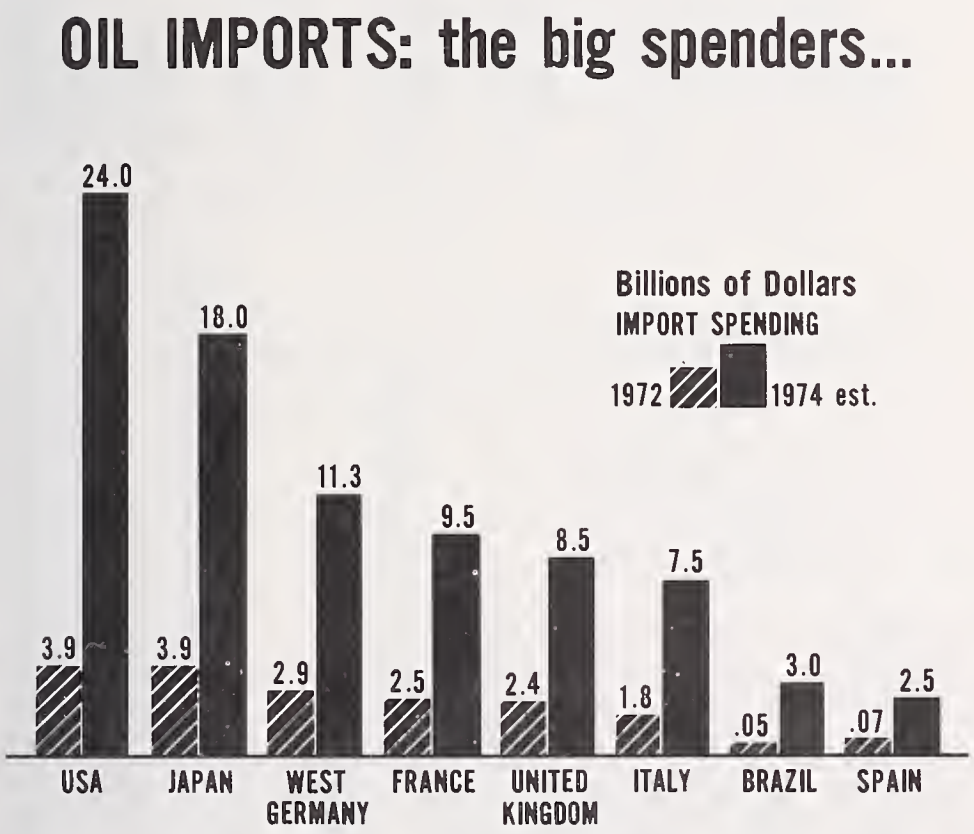


FIGURE 5

Where do these dollars go in the Middle East? In total dollars, the leader is Saudi Arabia with $29 billion, then Iran with $21 billion. Next in order are Venezuela, Nigeria, Libya, Kuwait, Iraq, United Emirates, and Algeria (figure 7). These are where the dollars

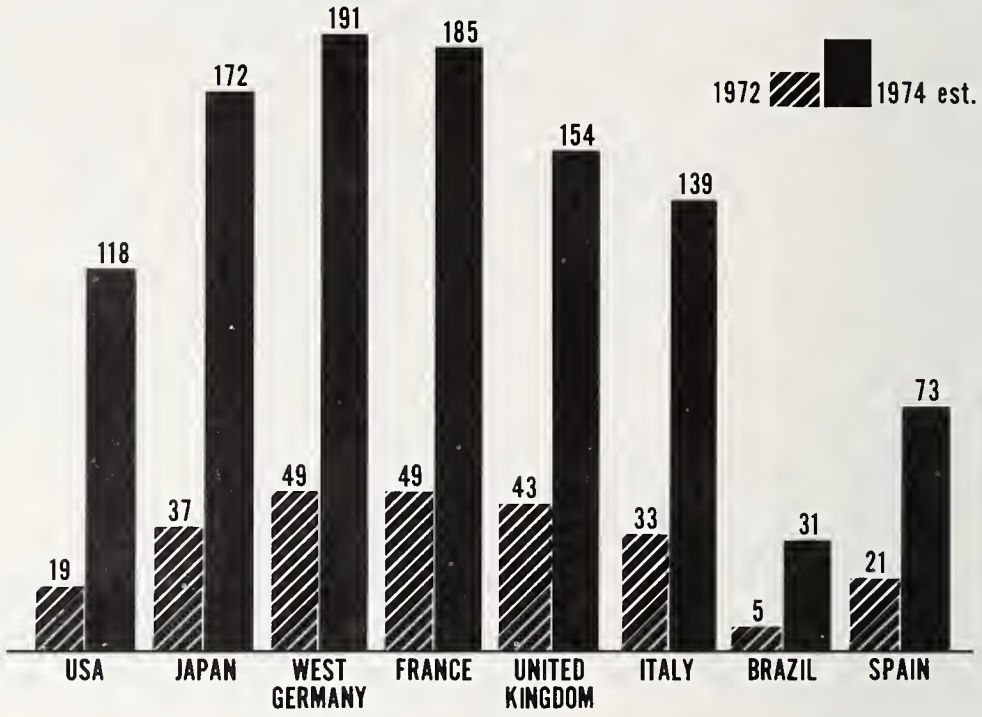


FIGURE 6

FIGURE 7

are flowing. The dollars are accumulating and they are being invested. I think many of you recognize that Saudi Arabia has announced a $5 billion program to invest in petrochemical plants and gas development and distribution within Saudi Arabia. Saudi Arabia has a very advanced plan for industrializing its country and improving the standard of living. Iran has been on such a program. Some of the other nations are just beginning to develop this, but they are going to use this oil money to develop their nations. Of course, they are buying arms too. They all wish to have American arms. We sold a great deal to Iran, and some to Saudi Arabia. I noticed in the morning paper that Libya is now saying let us be friendly with the United States because we now want U.S. arms also.

If we put this on a per capita basis (figure 8), we get a different perspective. The United Arab Emirates hit $36,000 per capita. They have very few people in that little group of states. It is often called Abu Dhabi for the capital or the head city. (It really is not the capital; it is not that well organized.) Kuwait is next, with over $10,000 per person. In Kuwait, education and all medical care are free. Saudi Arabia has $4,000 per person, still a very significant income; but Iran is down to $700 per person.

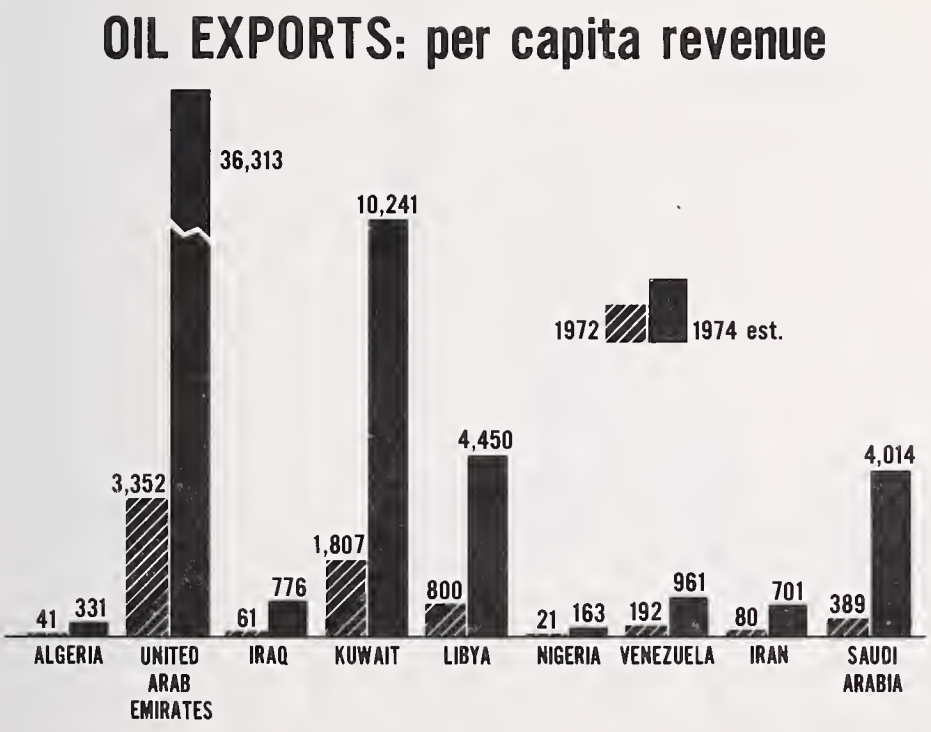


FIGURE 8

The population of Iran is much greater than Saudi Arabia, and we see Iran in the news being very much worried about the effect of inflation in world commodities and world industrial goods. Iran

is the leader in saying they need more money for their oil because inflation is destroying buying power. When you look at the $700 per person you can understand that they are more concerned than Saudi Arabia about inflation, and Iran will be the leader for pushing oil prices up in October.

The sleeper in this, as I mentioned earlier, is China (figure 9). China has some great potential oil bearing provinces, including the Yellow Sea which lies between Japan and China. China has had a fantastic industrial growth since 1950. She has discovered oil. She has become an oil exporter, even though her oil supply is rather small. China is clearly on the basis of developing coal and planning to use oil as a world trading commodity to help her foreign imports. It is too early really to see what China is going to do in total, but we could guess that ten years from now she is going to play a significant part in the world energy picture.

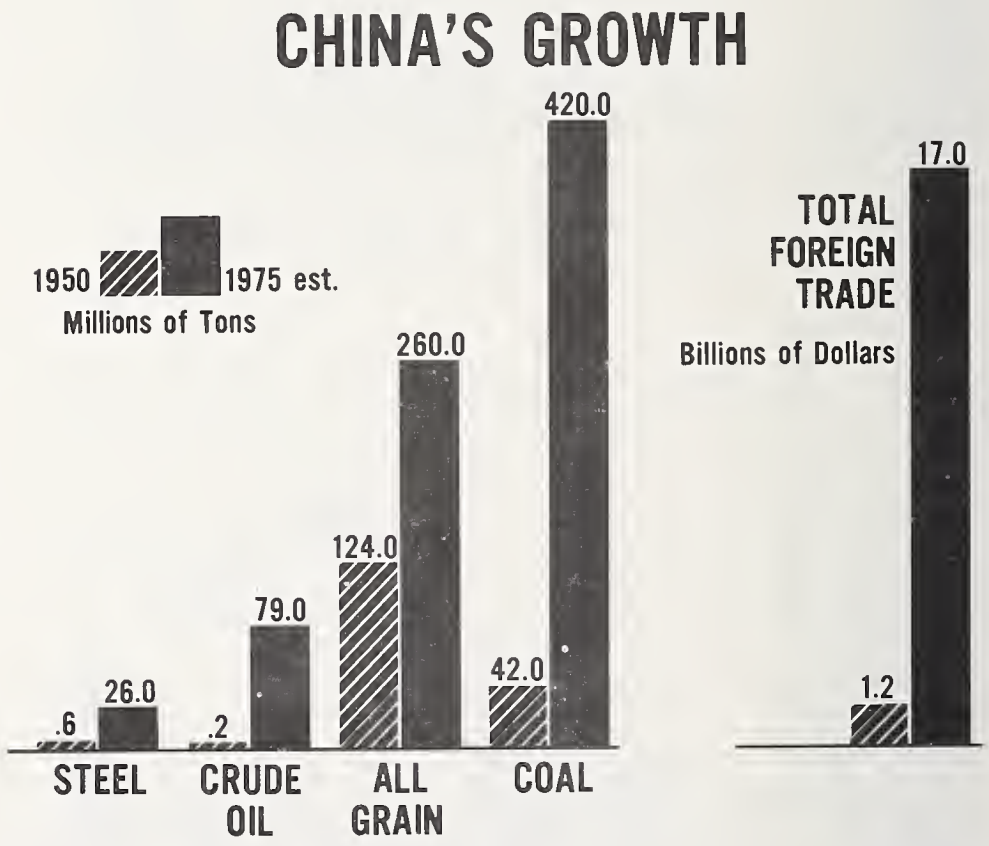


FIGURE 9

This brings us to the fact in this country that now is the time for us to develop our own sources. That is what project independence was supposed to be when it was announced. This means developing offshore. It means we are going to have to go for nuclear power; we are going to have to develop coal; we are going to have to do re-

search work for solar, tidal, wind, and all the other reasonable sources (figure 10). We are going to have to drill in deep and rough waters. We are going to need tankers and we are going to need ports because we cannot develop oil that fast. Anyone who says we can reduce oil imports in the next two or three years—or even four or five years—simply by making a decree that we will reduce imports has to face that we are going to have to do something very drastic to our nation's economy. If we want anything like a normal growth and a normal economy, we are going to have to have tankers; we are going to have to have ports to receive them; and we are going to continue to import oil.

FIGURE 10

If I may brag a minute, Union Oil is the world leader in geothermal production. We have a project at the Geysers, north of San Francisco. It is producing about 400,000 kilowatts now. It could go to a million. It is now being held up by the Public Utilities Commission. The Utilities cannot get permission to go ahead, and we have had a two-year delay in the program to get further production. We predict this field can produce enough electricity to supply the city of San Francisco. There are other prospects in the United States and they need to be developed.

We have a project in the Jemez Mountains of New Mexico, not far from where I was born and educated, where we have drilled a geothermal well. It has not yet been proclaimed commercial, but it is indicative that there are many places in the western United States where geothermal energy is available.

Western Colorado is one of the places that we need to consider for synthetic oil from shale. Developing shale is expensive. I think it will be coming, perhaps by 1980 or 1983. It will take time, but it is a substitute for foreign oil.

Finally, I would like to say that we have to be a nation dedicated to conservation if we are going to get to a degree of self-sufficiency, which I think we must have. We must not be in a position to be

blackmailed by a group of foreign states that band together and say they are going to use oil as either an economic or a political weapon. On this chart (figure 11) are some thoughts as to where savings can be achieved. I put up this chart partly because there is a great deal of talk that the only way we can save oil is to save gasoline. Sometimes in the U.S. Congress you would think a gasoline tax would be the only thing to save energy.

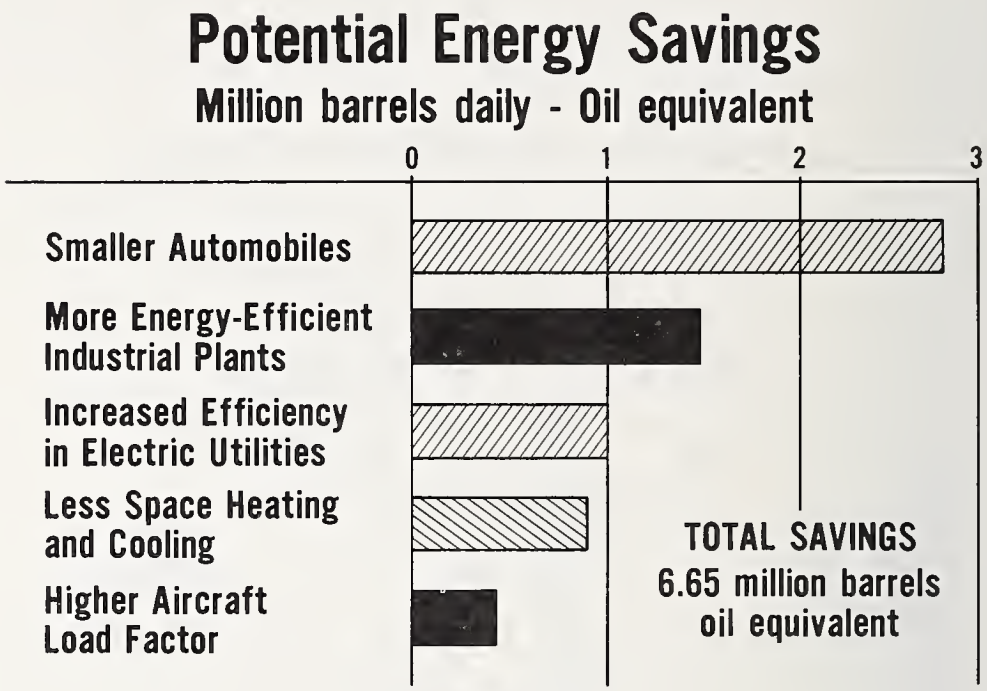


FIGURE 11

Smaller automobiles would be a significant way to save energy, and that heads the list of potentials at 2.8 million barrels a day. More efficient industrial plants, however, are a very significant saving. Other ways are: increasing efficiency in electrical utilities, replacing some of the older and less efficient utility plants; controlling space heating and space cooling in our society, letting the temperatures run high in the summer and low in the winter; and saving fuel in air transportation with higher aircraft load factors.

There are many other ways of achieving savings without drastic effects on our standard of living. In our headquarters office building, which our president set out to make an example of conservation, we have reduced the use of electricity by 40 percent. There are a few people growling about the escalators not operating at certain hours of the day, but other than that the building is entirely comfortable.

If we really develop a conservation ethic as a way of life, I think we can readily effect a 20 to 25 percent reduction in a total energy system of this country without any great handicap or any great

hurt. I think we must take on an educational program to convert to a more conscious effort in the use of our resources, particularly energy (as well as to convert to the metric system).

WHY NOT UNSHACKLE MEASUREMENT STANDARDS

by L. T. Wallace, Director, Department of Food and Agriculture, State of California

It is a pleasure to be here because I think this outfit is terriby important and will become increasingly important in the years ahead. I am truly glad to be here and welcome you all.

One of the things I learned very quickly when I was ranching was that no matter how good a herd of cows you had, there was always a tail end that needed improvement. That goes for the best herd anywhere in any country, and that is the spirit in which Walter Watson, Johnny Miller, and I have been talking about weights and measures and the whole area of public interest.

I think Walter and the county sealers are excellent people; and, frankly, I demand excellence from the crew because they are front runners. They must reflect the positive aggressive attitude that we have to take here in California and, hopefully, will take across the nation.

I would like to talk to you a little bit about a feeling I have had, one of discovery—and with that is both pleasure and dismay. Pleasure, as I said, of discovering our Division of Weights and Measures people—dedicated people, experienced and knowledgeable professionals; civil service in the best and truest sense. That does not mean dead behind the ears. That means really dedicated people working in the public interest. I felt dismay—dismay that I did not know prior to my taking this new appointment that such an outfit existed. Walter set me straight very shortly. I did not know the tremendous job that was going on. I felt further dismay because I do not think the general public knows much about the county sealers and the whole Division of Weights and Measures.

I do not know about your respective states, but I will lay you odds that not very many people know the terrific job that you people are doing. I think it is time we changed that.

Since then, I have spent a lot of time getting acquainted with Walter Watson and Johnny Miller and trying to keep them from

hiding their lights under their respective bushels. That was hard. Walter and his crew are not avid limelight seekers and, frankly, I am not either; but I do think that when you are doing as good a job as they are, we are going to have to let people know about it.

What did I find out as we talked? At the national level I found a visible reluctance to insure that when consumers buy certain items like bacon or flour that they are pretty well guaranteed that the packages actually weigh as much as the label says. At the local level I found there were terrific problems of funding. As a public official I began to weigh the priorities of public expenditures.

On all levels—local, state, national—I found less than a total commitment from both the public and private sectors to offer the consuming public (and stand behind) goods and services of stated quality and quantity per stated unit price. Now, that bothers me a lot. So, what was needed?

We began looking. We began looking at ourselves and talking with county sealers. We decided three things; and through this process we began to combine our sense of real pride, professional pride, and a growing enthusiasm with recognition of the job ahead. What are the three things? First, there is a need for our people to look at themselves positively and tell people what a good job they are doing. Secondly, I think there is a need for more cooperation and coordination programwise, both interdepartment and intradepartment. Thirdly, I think there is a need within the Division to articulate what it is "we" want to do. Forget anybody else. What is it that a group of knowledgeable professionals wants to do? What is "our" agenda of program and priorities?

Walter and Johnny know that they have my complete administrative support all the way up and down the line. I hope the county sealers know that too, because all of them do. They are fine people, fine professionals; and they are the key to our successful program.

How do we get that job done? First, we have to put a priority on our programs and activities which have the highest payoff. This is a hard thing to do with all the diverse statutes and regulations, measurements, weights, quantities, qualities, and geographic areas we have in California.

What about compliance? What about public savings? What about timeliness? These are some of the criteria that were used and are being used to assign a priority. Secondly, we began to reevaluate our present way of doing things. For example, we are now turning much more to "end result" type inspection. I think this can spread limited funds. I guess every state here is going to run into funding problems. This means we are going to have to more effectively allocate our scarce resources to get more productivity faster. That means we cannot work at the bottom of the pyramid; we are going to have

to work at the top of the pyramid and force personal responsibility downward.

There is no reason why the Division of Weights and Measures people always have to be good guys. If we are after higher rates of compliance in the public interest, and if we are after better products, more honest advertising, more honest representation, both within the public and private sectors, we have got to force ourselves upward to that tip of the decision-making pyramid and force responsibility back downward. We do not have to fix the scales for everybody who has scales. We can weigh the product that has gone over the scales; and if the product is short weight, we can tell the user to go fix his scales. That seems logical and it gets us out of the scale repair business. Let somebody else handle that one. That is what I mean.

You can check a lot of short weight items in a store and let the responsibility fall backward. Try to get the owner-user to be more responsible.

We are also making more use of the tools at hand. What are some of these tools? One is sampling. Are we really up to date on the most scientific, most accurate sampling methods, within certain confidence limits, that we think we can match up with our budget—and I do not mean in the .001 percent range. We do not need to worry about that fine a cut; but if we are after a 90 percent compliance, is the sampling method we are using now the best? Are we using the best technology available? The same goes for measuring and testing devices. Are we using the best programming methods for the materials and the equipment that we have? Are we using cost sharing at all between counties? Are we sharing anything between counties? Does it make any sense to share anything between counties? Another tool is the citation. We are making more use of citations, penalties, and fines, and we are making the citations public. That is a very interesting force for compliance. When you know the news will be made public if you are caught for short weight, then it does make a difference on compliance level attainment.

What about results? I think we are already seeing results. Certainly more attention is being paid to the Division of Weights and Measures. They are highlighted in the Department of Food and Agriculture here in California. There is increased public protection already being accorded the Division. There are increased compliance levels, and I think there is a corresponding increase in the efficiency of using public funds. I would like the public to get more from its tax money expenditures.

There is also increased attention paid to the way device users can help pay part of the general cost of inspection. This goes back to what I said about the personal responsibility from every citizen. There is an increased responsibility for device accuracy put on the

owner-user. There is an increased attention to honesty and accuracy in the marketplace wherever an item is inspected; and this, I think, is what makes any country worth living in. We want to continue to be able to believe people in the marketplace.

Now, those are part of the results. We are still going pretty much alone. Herb Cohen, who is my legal adviser, tells me in the Rath case we have had no cooperation from any federal agency (with the exception of the National Bureau of Standards, and I underline with the exception) in pursuing our bacon short weight/measure case, which is now almost three years old.

Let me just read a one sentence paragraph taken from the June 1975 issue of Consumer Agency News, published by the Center for Consumer Affairs, University of Wisconsin in Milwaukee. It says:

> "Even the California regulations challenged by Rath required only that the average of the sample of the lot equal the declared net weight."

That hardly seems unreasonable to me. I know everyone is concerned about where weights are measured—at the point of manufacture, the point of wholesale delivery, the point of retail delivery, or some place in between, such as an interstate line. Perhaps we should point more to the point where the consumers are directly involved—where they read the labels, where they have been taught to increasingly believe what they read about food quality and quantity. Again, that does not seem unreasonable to me. We are proceeding on the basis of a program emphasizing honesty and accuracy for the consuming public. Frankly, I wonder why so many of the federal agencies are so reluctant to stop condoning short weight measures. I just cannot understand it.

We are going to continue our fight and continue to wonder why certain traditional vested interests continue to hold sway over what seems to us to be an obvious conflict of interest.

As you can see, we have identified some needs and we have identified some ways to fulfill those needs. It is a process. It is not a once-and-for-all thing. We have some results already; we are going to get some more results. I think that Walter and his counterparts in all the other states and in Washington, D.C. are the forerunners of trying to enforce honesty and accuracy in the private sector, of which I am a great admirer. Without this honesty and accuracy, somehow America is not going to quite measure up to its highest standards as I think it should.

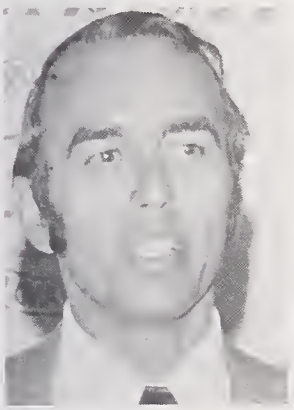
Enjoy yourselves in California. It is a great place. Thanks very much.

AFTERNOON SESSION—TUESDAY, JULY 15, 1975

(Earl Prideaux, *Vice Chairman*, Presiding)

INTERGOVERNMENTAL COMMUNICATION MECHANISMS

by Ralph J. Barra, Intergovernmental Relations Officer,
Office of the Associate Director for Programs,
National Bureau of Standards



For the next twenty minutes, I would like you to do a little dreaming with me and a little imagining, because I am going to present some new ideas for your consideration.

If you keep a few key words in mind—partnership, cooperation, opportunity—as I tell you about the National Bureau of Standards' (NBS) own experiences in the intergovernmental relations activity, you may see a way that you can use that kind of experience in your own endeavors.

The NBS experience, specifically mine as intergovernmental relations officer, may serve as an example of the opportunities that are emerging in new areas of cooperation to solve many of the measurement problems that are facing our local communities and our nation today, and especially tomorrow. These opportunities are not opportunities only for NBS. They are also opportunities for local weights and measures officials.

Tomorrow's measurement problems will not be solved by the Federal Government alone. Those problems will not be solved by state governments alone. They won't be solved by cities alone. They won't be solved by municipalities and counties alone; and they also will not be solved by the universities alone. The solution to those problems that we have facing us, not only in measurement but in many areas of the economy, are going to require new partnerships. In fact, on this afternoon's program you will hear about a few of those partnerships. The next speaker will tell you about California's own Measurement Advisory Committee which is a partnership between state executive branch agencies, industry, and academia. The committee's efforts are focused on the measurement problems of the State of California.

Later this afternoon, Frank Jones will tell you about partnerships that are developing between NBS and several states in the area of the measurement of moisture in grain. Later, the partnership between

NBS and state weights and measures officials in the calibration of radar speed measurement equipment will be covered.

The organizations that are required to bring the various parties together in these communication modes are organizations like the National Conference on Weights and Measures. This Conference's experience has proven to other sectors that it can happen; that the Federal Government can cooperate with state and local government officials and with industry to focus on national problems. Without organizations such as this Conference, we would only have a fragmented effort going on and progress would just be at a standstill.

At this time I would like to tell you about some of the communication mechanisms that have been identified by the National Bureau of Standards. Hopefully, you may identify some of these organizations as being ones that you might try to use, if you haven't already, to broaden your own horizon and your own involvement in the solution of technological problems that are taking place in your state.

Many of the organizations are much broader based than just measurement; but I found through the discussions I have had with these people that measurement technology is interwoven in most of their problems. They are looking for measurement-oriented people to help them solve their much broader based problems. It could be an exciting experience for any of you who want to get into a larger arena.

Let's take a look at NBS's Intergovernmental Relations activity. The activity is primarily a staff function for the executive board of the Bureau, and it interfaces with a long range planning group. It serves as a "feedback" mechanism to the long range planning function of NBS and, hopefully, will impact on many of the programs that the Bureau will be performing in years to come. By having a better feedback mechanism from state and local governments, we should be able to learn of their needs enough in advance so that the research and development and the projects at NBS are more relevant to those needs.

The Intergovernmental Relations activity is also cooperating with the Information Programs Office. For the first time, we are, in a systematic fashion, getting news about NBS programs into the hands of state and local government officials and their staffs on a periodic basis. For example, our monthly *Dimensions Magazine* is being used to alert state and local government officials to programs that are taking place in NBS.

It is pretty hard to take a look at all fifty states and come up with an organization chart that will fit all of them; but we can look at the seven major services that the agencies of state government perform. The *Book of the States*, published by the Council of State Governments, lists the major functional areas as shown in figure 1.

Most weights and measures officials are in the agricultural part of state government. Some are now in the public protection or the consumer protection areas of state government. I feel that there is a trend in that direction. The experience of weights and measures officials in the area of consumer protection, along with their legislative background, could serve as a nucleus for the formation of a consumer protection agency in state government. You may see this as a development that may broaden your opportunities to serve in many other areas of consumer protection.

As shown in figure 1, the governor's science adviser may also be a point of interaction for NBS with the state government. Several science and technology bills in Congress call for a strengthening of the role of science adviser in the states. If that takes place, it may be a very effective communication mechanism between the Federal Government and the states.

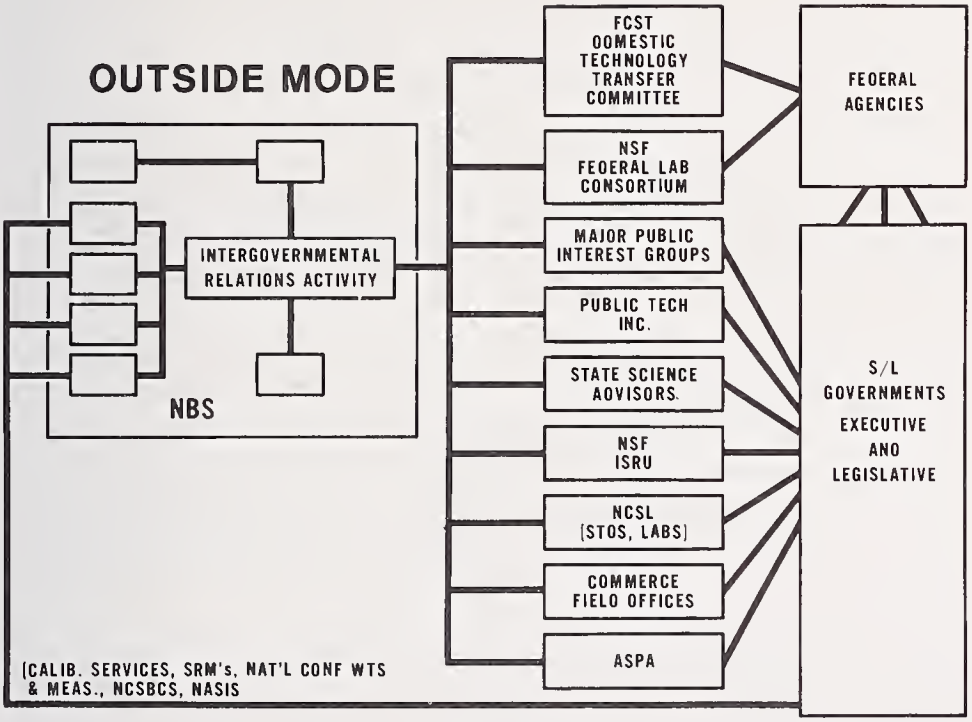


FIGURE 1

The information flow from the Bureau to the states and from the states to the Bureau takes many forms. Once we are aware of the specific needs of a state or local government, we are able, with very little effort, to get timely information to them by way of existing publications covering that specific subject. At the same time, we have newsletters flowing in from many state governments and state associations. For example, the *Nation's City Magazine*, which brings us pretty much up to date on a lot of the issues that are facing the

cities; the *National Governor's Conference Bulletin;* the *U.S. Conference of Mayors' State Government News* and so on. There is an unlimited amount of information available if you are interested in getting it.

There are many groups, as shown in figure 1, already in existence that can be used as communication mechanisms by a federal agency. The NBS experience serves as an example to other agencies in the Federal Government of how to establish communications with state and local government constituencies. The state and local government constituency includes not only the executive branch of state government, but also the legislative branch, which is an up-and-coming force in Washington.

The Federal Council on Science and Technology Committee on Domestic Technology Transfer meets in Washington about once every month. At these meetings, the several federal agencies engaged in research and development activities and technology transfer share their experiences and map out cooperative ventures to improve the flow of technology to state and local governments.

Another communication mechanism is the National Science Foundation's Federal Laboratory Consortium. About four years ago, this consortium was formed by the Department of Defense laboratories that are located in some thirty states around the United States. About three dozen laboratories identified themselves as potential resources for state and local government officials. The consortium now includes some of the National Aeronautics and Space Administration laboratories, as well as some Energy Research and Development Adminstration laboratories.

The major public interest groups in Washington could also be invaluable communication mechanisms. The U.S. Conference of Mayors has just established a Science and Technology Committee that is going to be delving into many of the technological issues of the cities.

The National Conference of State Legislatures has two committees; one is called the Intergovernmental Relations Committee and the other is called the Science and Technology Committee. These committees are very active in the role of tying together new partnerships and new modes of cooperation between the Federal Government and the state legislatures. They are looking for ways to transfer knowledge and technology to the level of government that is closest to the people so that technology is applied to the problems that the people themselves are identifying.

Organizations like Public Technology Inc. are trying to identify the needs of the cities and to package those needs in such a way that they can be understood by the scientists working in research. At the same time they are working on the translation of the language of

the scientists into words that the state and local officials can understand so that they can see whether or not they can use some of that knowledge and some of that technology that is available. Some of the technology that can still be applied has been available for over ten years.

The National Science Foundation has an Intergovernmental Science and Research Utilization activity that is very active in working with the states. They are funding experimental projects to test different forms of partnerships between federal, state, and local governments to work on problems that are identified by state and local governments. There is no reason why the voice of weights and measures officials should not be included in the voices that are heard in those kinds of projects.

The National Conference of Standards Laboratories, which ties together many of the industrial measurement standards laboratories with Federal Government laboratories and some state measurement laboratories, is an excellent example of a partnership trying to solve problems that are taking place in industry as well as in government in a cooperative fashion rather than in a fragmented effort.

NBS also has, as a communication mechanism, the many U.S. Department of Commerce field offices located around the United States. They have been used very effectively in the area of education, energy conservation and metric conversion. These field offices will probably take a very active role in the new programs that are coming.

The American Society on Public Administration has a Science and Technology Committee. This committee could serve as an excellent mechanism to bring together government officials at all levels to focus on measurement-oriented problems. However, this will not happen unless people like yourselves from the measurement community join together and have their voices heard.

One of the most active public interest groups in the area of technology transfer is the National Conference of State Legislatures (NCSL). This Conference has a membership of 7,600 legislators. For years, these legislators had been on the outside looking in. They were not too involved in knowing what was happening in Washington; but that is changing now. They hold the purse strings in most state governments and are now taking a closer look at what kind of money is coming into the states from Washington. They are also trying to identify the major issues of the states so that the monies sent to the states can be used in areas that are most beneficial to each state. Five areas that have been identified are energy, natural resources, law enforcement, transportation, and food and agriculture. In the food and agriculture area, and probably in the others, the element of measurement technology should be included. It is going

to take people like you and others in the measurement community to bring this to their attention. The legislators have to know that you have measurement problems. If they do not know, they are not going to be looking for funding to strengthen the measurement activities in the states.

The Science and Technology Committee and the Intergovernmental Relations Committee, as shown in figure 2, are pretty representative of the country. Some 45 states are represented on the Intergovernmental Relations Committee and several states are represented on the Science and Technology Committee.

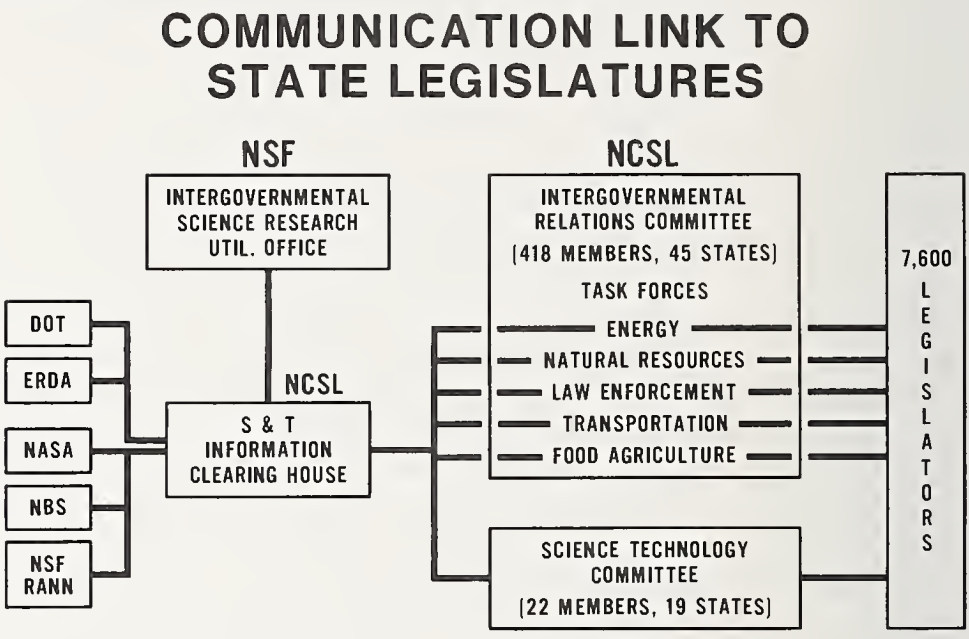


FIGURE 2

A science and technology information clearinghouse function in NCSL has required the funding of federal agencies as well as the National Science Foundation. The National Bureau of Standards, the National Aeronautics and Space Administration, the Department of Transportation, and the Energy Research and Development Administration are four agencies at the present time that have cooperated in the project. The clearinghouse will try to identify the technology needs of the states through the members of these task forces and, at the same time, to match those needs to the resources that are available.

Where does NCSL fit in? Where does the National Conference on Weights and Measures fit in? There are various industrial state and federal laboratories located in your state. Each has its own specific resources that could be applied to solve local problems; but no one has taken a look at the whole picture and tried to identify a state's

total resources. In many cases, if a problem emerges in a state executive agency, say a weights and measures activity, and that activity cannot solve the problem, the search for a solution just ends there. A communications network should be established between the various laboratories of a state so that no matter where a problem comes up, no resource is left out in trying to solve the problem. Of course, if it cannot be solved in the state, then the next step is to go outside the state and find out what other state may have a solution to the problem. If you still cannot get a solution, then it is time to go to Washington and find out whether some technology can be transferred from the Federal Government to solve the problem.

It is a communications challenge that we have facing us. We are not going to solve the kinds of problems that are emerging individually. It is going to take a lot of cooperation. It is going to take your getting involved and knowing a little bit about some of the other agencies in your state and some of the other laboratories in your state so that they know who you are. If a measurement-type problem comes up, they know how to get in touch with you.

DISCUSSION

Mr. L. O. Leenerts (Purex Corporation): Do you have the same lines of communication with other Federal agencies as you indicated you have with the state agencies?

Mr. R. J. Barra (NBS): Yes. In fact, I mentioned one of the lines of communication, and that is the Federal Council on Science and Technology. The Domestic Technology Transfer Committee is a direct line with almost all Federal agencies, Agriculture included. I cannot think of one agency right now in the Federal Government that is doing some research and development that does not have a representative on that committee; and we are working very closely with that committee. That is just one example. The National Bureau of Standards (Bud, maybe you can correct me, I am guessing on this I think) gets something like 30 percent of its budget or 50 percent from other Federal agencies.

Mr. H. F. Wollin (NBS): Forty.

Mr. Barra: Forty percent of our budget comes from other Federal agencies, and if you take a look at the list of projects that we have going on right now at the Bureau of Standards, you know, almost every Federal agency has asked us to do something in the measurement area.

Mr. Leenerts: I guess my next question really is not a fair one because it has some political overtones. How does the Bureau feel about the Senate bill, I think it is 200, that would form the agency for consumer advocacy which would be doing essentially what you are already doing by yourselves?

Mr. Barra: I guess I would have to defer that. I do not think the Bureau has a position at the present time, but maybe sometime this afternoon you might be able to speak to some of the other NBS people here and get a better answer than I can give you.

THE STATE OF CALIFORNIA MEASUREMENT SYSTEM

by Steve Kozich, President, Quality Audit Company,
Whittier, California

It is certainly an honor to come before this group and have something to say that I feel may contribute to the effectiveness of your job.

Having spent many years in industry as a quality control manager, I know the problem of production taking too much time to build something and not having enough time to inspect it. I understand the problem that you really cannot inspect the inside thread of a nut too well; and I also understand the problem that the landing gear on aircraft that we go home on must be hard enough to sustain the thrust, force, and weight of the aircraft.

John Quincy Adams said something like: "To know something it must be measured and the measurement must be related to some unit."

In quality control work and in my background, I like to refer to Ed Thorndike. He was a psychologist, and I believe he spent most of his time working on the human mind. But, in his work he has provided some words of wisdom that can be taken to general managers and presidents of major corporations. Thorndike said something like this: "Everything that exists must exist in some quantity, and any quantity can be measured."

Therefore, we in the field of measurement science have no excuse for both quantity control and accuracy of measurement. It is expected that our equipment and devices will become faster and more precise.

CONFLICTS

There is another problem here on the conflict of producer versus control, manufacturer versus control, and seller versus control. Maybe the best way I can relate that conflict is through my experience where I have a little story about the production manager who went in for a physical, only to come back and find out that he was going to die from cancer. The general manager went to him and said, "John, I heard about the physical and I am extremely concerned.

You have given me 20 years of good profit and a lot of your life. I want you to spend the rest of your life any way you wish, and I will pick up the tab."

John said, "Move me into quality control."
"My goodness, you want to run it?"
"No, no, no, I don't want to run it, I just want to be an inspector."
"What?"
"I just want to be a bench inspector."

So, the production manager went into quality control the following Monday morning, spread out some nice green billiard cloth and brand new measurement equipment, and he was checking more parts than anybody else in the department. About two weeks later the president of the company came up and said, "John, I don't understand. There have been times when we have had labor problems and I couldn't see your point until I went home or the next morning. There were times when I didn't think you'd get something out and a week later you'd show me, but here it has been two weeks and I'll be darned if I can figure out your objective."

John looked up at him and said, "If anyone down here has to die, it might as well be an inspector!"

So you never want to misjudge that conflict. They may be working hard, but they are never in weights and measures.

There is another point that I would like to make, being a native of California. Even though I have traveled to every state and several countries, I have lived here all my life. I have attended California's fine universities and worked in its fine industry. Over the last seven or eight years I have been associated with a group of weights and measures people predominantly because of the weights and measures conferences and the measurement science conference at Cal Poly that we hold every year, which, incidentally, is the first Friday and Saturday in December.

If I were to put our weights and measures activities in California into a simple phrase, from my viewpoint, I would have to tell you that I believe the State of California Division of Measurement Standards and the county sealers of this State are probably providing our consumers and our citizens the finest protection of any state or nation in the world. I feel that if I look back and define who is directly responsible, I would have to say that Walter Watson is probably the quarterback and Tiny Sandel, the sealer in San Bernardino County, is probably our right tackle.

You can see by the attendance here that we are working together up and down the State; the sealers in California communicate very well. I have addressed groups of sealers here in California several times and I am extremely pleased to see the high interest for con-

tinued truth in measurement. I want to take my hat off to these fine people in weights and measures here in California.

Some of the things I am going to cover here in a very short period of time are our business environment, the State of California Measurement System (SCMS), some of the accomplishments of SCMS, and trends in weights and measures as I see them.

BUSINESS ENVIRONMENT

You have to have a system to fence an environment (production versus control), and the marketing aspect also has a lot to do with labeling. The basic problems of budget, the types of problems that weights and measures people face, also affect their time. Statistics have a lot to do with the conflicts. Corporation trends have a lot to do with conflicts and truth in controls. Then, when we get into the measurement system, I can show you several things that we have developed for the purposes of organization and some of the activities, the membership, and the benefits that will be produced from this activity.

The problem that the average weights and measures official sees today is basically that he is expected to do more. Generally, the staff is one pay raise behind time. You generally need new technical support and technical information, new equipment is entering use much faster than before, and you have a problem of training people to maintain the pace with new devices that have been approved. The cost of our products is higher than ever before. The consumer is smarter, he knows what your job is today; therefore, you have to give him a straight answer. The profit squeeze requires industry to work as close to the legal limit as possible. When the Federal Government decides to publish statistics, industry tries to make the figures look good.

I ran across a little write up in a recent publication that said a Hershey candy bar sells for ten cents. From 1965 to 1973 there was no price increase, but the weight went from two ounces down to 1.2 ounces. The Federal index reported that there was no gain in price on the Hershey candy bar. There was no comment that there was a 40 percent change in weight.

So you see, here is a marketing genius who maintained the same package and slipped the consumer a quantity reduction at the same price. I can only say that I will never forget the professor at San Jose State University who told me how pleased he was to attend the Hershey Trade School, and that the commodity never had to be advertised because it was so pure and sold by word of mouth. I don't mean to say that Hershey isn't a good company. I just mean to say that times change and sometimes the way we measure ourselves causes a change in our direction.

Let's take a look at corporation leverage. In 1950 we had 440 beer manufacturers. Today, there are 77. General Electric and Westinghouse could have come out with a fluorescent tube about 12 or 14 years before they did and conserved a lot of enrgy; but then they wouldn't have sold so many light bulbs. Years ago, Gillette could have quit selling its blue blade, but it took a British company to bring stainless steel to the U.S. market. Years ago, our automotive industry used to let us maintain our automobiles. Today you can hardly get your hands down to check the oil.

This is what I call corporation leverage created by marketing and the selfish grab of the dollar. My point here is that there is only a profit objective in many of our corporations.

THE STATE OF CALIFORNIA MEASUREMENT SYSTEM

Let's take a look at the State of California Measurement System. I can't help but tell you folks that I believe that six or seven years of hard work (chaired by Walter Watson and working with different people within this group towards a common understanding of our objective) has benefited the measurement community. A considerable amount of personal time has even transferred some of our efforts to a university program in measurement science. This has been one of the finest and most rewarding times I have been able to offer to what I feel is good for society.

PURPOSE AND OBJECTIVES OF SCMS

What is the purpose of the State of California Measurement System? Identified in the bylaws or the charter are nine basic purposes; but if somebody could come up with a tenth one, I am sure that a simple letter to Walter Watson would give it an additional impact. The nine purposes are:

1. To identify the highest level of measurement capability within the State of California for every unit possible.
2. To coordinate information on measurement calibration services. When someone who has a problem doesn't know where to get his equipment calibrated, maintained or adjusted, we hope that we can provide this information to him.
3. To identify measurement needs.
4. To coordinate liaison between NBS and other Federal agencies.
5. To support continuing education in measurement science.
6. To assure continuous availability of measurement precision and accuracy as may be required by various government agencies, industry, medical and educational institutions.
7. To eliminate unnecessary duplication of measurement equipment and resources.

8. To extend measurement capability and resources.
9. To identify measurement research needs and transfer this information to the necessary and the appropriate government agency.

Now, that is a lot to expect from a small group; but you would be surprised how much we have learned from one another by communicating among ourselves and how much guidance we have been able to provide to each other.

We have found the following: (1) the people in weights and measures understand the legal aspect of measurement control; (2) the industrial members of the organization can provide input to some new measurement requirements; and (3) various government agencies have different problems associated with the same unit of measurement.

The committee is chaired by Walter Watson, Chief of the California Division of Measurement Standards, and includes two county representatives, Maynard Becker of Los Angeles County and Eugene Smith of San Mateo County. Industry is represented by Don Greb of Lockheed and Dave Mitchel of Rockwell; both Mr. Greb and Mr. Mitchel have been national presidents of NCSL. Other members include Les Evans of National Astro Laboratory in Burbank, Dean Brungard from the Teledyne Corporation, Dr. Heath from the California Highway Patrol, Dr. Bowles from the State of California Water Resources Board, and Dr. Greenberg, State of California Department of Health. Bob Horger, from Santa Clara County, and Bill Cowan, who have both retired, have also worked with the group. During Mr. Cowan's time with the State, he helped give the State of California Division of Measurement Standards its new name and higher position in State government. Bill did a lot for weights and measures, and I am happy to be able to fill in for him today.

RECENT ACTIVITIES OF THE SCMS COMMITTEE

You might say you haven't heard too much about the activities of the State of California Measurement System and ask what we have been doing. Going back through my notes to determine what we have accomplished, I will give you a brief report. In early January of this year, Dr. Ernest Ambler and Mr. Ralph Barra came to Lockheed and gave us information on the various agencies and people in the State of California who were utilizing the services of the National Bureau of Standards. They provided a very good briefing of activities at NBS and what they envisioned as the new direction of coordination and liaison work with the State.

We were very fortunate at that time to also have the California Highway Patrol, the Department of Health, and members of the

Water Resources Board represented there. I thought it was extremely interesting to learn that the California Health Department has certified over 2,500 laboratories here in the State of California. When I found out that some of these standards are not traceable to NBS but only to the Environmental Protection Agency (EPA), I almost did a backflip.

ACCOMPLISHMENTS OF SCMS

In February of 1975, we met at Rockwell. We developed a charter committee and assigned a committee to develop a work action form so that we could issue a form and have an action document submitted to the committee for action or transfer to the proper government agency.

In March of 1975, we met at the Division of Measurement Standards in Sacramento. Dr. Emanuel Horowitz came out from NBS and provided an excellent briefing in his area. In May of 1975, we met at the Marriott in Berkeley during the Air Quality Control Symposium, and we received our charter and bylaws.

In June of 1975, we met again at the Division of Measurement Standards in Sacramento. Our charter was approved, the work action document was revised and finalized, and the first action request was sent out by this committee to the Environmental Protection Agency for action.

That is quite a bit of work in six months. The thing I am proud of is that we developed a system that will let other work go out of here much faster. Our next meeting will be in Burbank at the National Astro Laboratories in October of 1975.

What benefits can we expect from this system? First of all, I believe we have developed a coordination system for measurement problems. Second, I think we will have a directory of measurement resources within the State. Third, I think we will identify legislative needs, and this is where weights and measures officials really outshine the quality control people in industry. They really know how to identify conformance and turn it into law. I believe each state could establish a similar system and particularly work on the exchange of data.

TRENDS IN WEIGHTS AND MEASURES

What are some of the trends? First, there will be more authority for weights and measures officials—Ralph Barra mentioned it in his talk—and a move towards consumer affairs. Here in the State of California there are many new requirements in the point of sale, such as the ticket that you use on the Bay Area Rapid Transit (BART). The money goes in and the automatic ticketing equipment records the cost magnetically. It takes your five dollar bill and

gives you $4.40 in change in the form of a ticket. This is a point of sale. We still don't have legislation on the control. I am sure it is done right, but how long will this equipment that is working right give you integrity in the proper change? These things have to be worked out.

The second trend is a greater movement towards surveillance. Mr. Everett Black, in Ventura County, California, has worked in that area, where the pressure is on the person who uses the device —he needs to service and maintain his own accuracy and be responsible. This action results in greater control and makes better use of county personnel and resources.

Third, I think one of the things we are working for in the State of California is the assurance that when you pick up a pound of bacon, regardless of where it comes from, there will be one pound in that package even if quite a bit of it is water.

CALIBRATION OF POLICE RADAR INSTRUMENTS

by David W. Allan, Frequency and Time Standards Section, Time and Frequency Division, Institute for Basic Standards, National Bureau of Standards, Boulder, Colorado *

and

Frank H. Brzoticky, Metrologist
Weights and Measures Section, Department of Agriculture
State of Colorado

In common use for traffic speed control is a Doppler radar gun. The basic principle of operation of these guns is that the radar signal reflected from a moving vehicle is shifted in frequency by an amount directly proportional to the speed of the vehicle relative to the radar gun. Intrinsically one sees that such a radar gun is a frequency measuring device. The typical way of calibrating these radar guns is to place in front of the gun a vibrating tuning fork which produces a reflected signal to which the radar responds as though it were a moving vehicle. There exists a well-known relationship between this signal and the speed of the vehicle provided the radar frequency is known.

A question raised by the judiciary system is how does one know that a tuning fork used to calibrate a radar gun is at that certain

* Presentation was made by Mr. Allan.

specified frequency. Because of this question, several of these tuning forks have been brought to the Frequency & Time Standards Section of the National Bureau of Standards (NBS) in Boulder, Colorado for calibration. For example, the radar guns now operating, using the Federal Communication Commission (FCC) allocated frequency of 10 525 MHz (a "Hz" historically was designated cycle per second), have a 50 miles per hour calibration point using a tuning fork with a vibration frequency of 1569.54 Hz.

The demand for this calibration has increased to the point where it has become quite clear that it should be set up as an ongoing service. It seemed out of the context of the NBS mission and logistically difficult to provide this service nationwide. However, a reasonable alternative seemed to be to have the states' standards laboratories provide this service. A pilot program was set up with the Colorado State Standards Laboratory to demonstrate feasibility of a measurement system which would have traceability to NBS.

However, the possession of even an NBS calibrated tuning fork is not enough. Some of the available FCC allocated frequencies for law enforcement radar include 10 525 MHz and 24 150 MHz; the vast majority of current radar guns use the 10 525 MHz allocation. Suppose, for example, that a radar instrument which was designed for 10 525 MHz had a microwave oscillator which was detuned (outside the FCC allocation) to 12 000 MHz; then that radar instrument would measure a vehicle which was actually traveling 50 mph as traveling 57 mph even though a 50 mph tuning fork made for that gun would cause it to read 50 mph. Similarly, if a 50 mph tuning fork made for a 24 150 MHz type radar gun were used to calibrate a properly functioning 10 525 MHz type radar gun it would cause the latter to read 115 mph! For the protection of all parties, it is essential that both the frequency of the radar signal as well as that of the radar instrument's accompanying tuning fork be certified as correct within accepted accuracies. To directly measure the frequency of the radar signal is a nontrivial problem requiring sophisticated equipment; however, an indirect measurement of the radar frequency which can be easily implemented in the field is outlined below.

Fortunately, the microwave oscillators typically used in most radar guns have proven to be very stable, and being solid state devices they endure the rigors of field usage (e.g., shock, vibration, large temperature and car battery voltage variations) and still read accurately, i.e., ± 1 mph. The FCC allocation tolerance is comparable to an accuracy of ± 0.1 mph at 50 mph, and two of the major vendors in this country, which have sold about 20,000 radar guns, report

that of the ones returned for repairs and maintenance almost none of them were outside the FCC allocation tolerance. It is still recommended, however, that the law enforcement officer using the radar gun occasionally check the radar frequency by transporting the gun in a vehicle with a calibrated speedometer, and while pointing the gun at a stationary object compare the radar gun's reading with that of the calibrated speedometer. The readings should agree within 2 percent ($\pm$ 1 mph at 50 mph) if the radar frequency is correct within 1 percent, the angle of pointing of the radar gun is within about 8° of the direction of motion of the vehicle, and the speedometer is calibrated to within $\pm$ 1 mph.

The above procedure or one equivalent to it is mandatory for completeness because of the way the Doppler equation is used in most speed radar instruments. The Doppler equation may be written:

$$\frac{\Delta\nu}{\nu} = \frac{2\,v\cos\Theta}{c},$$

where ν is the radar microwave carrier frequency transmitted by the gun, $\Delta\nu$ is the radar signal received by the gun as reflected back from the moving vehicle minus ν. v is the approach velocity of the moving vehicle relative to the ground. Θ is the angle between the pointing direction of the gun and the direction of travel of the vehicle, and c is the propagation velocity of the radar signal. Most, if not all, radar guns are constructed to simply measure $\Delta\nu$ under the assumption that Θ is zero (0), and that ν is within the Federal Communication Commission (FCC) frequency allocation. Under these assumptions the gun can be made to directly calculate and display the value of v well within a 1 percent error. The tuning fork placed in front of a properly operating radar gun simply generates the signal $\Delta\nu$ commensurate for some velocity v under the same assumption that if the tuning fork's frequency is right the radar gun's reading will be right. However, if a gun's radar signal ν is off in frequency (outside the FCC allocation) then this radar gun's indicated velocity of a vehicle will be off by an amount directly proportional to the amount ν is off from the allocation assumed in the design of that gun, even though a tuning fork used to calibrate the gun gave the right gun velocity indication. The probability of being outside the FCC allocation seems quite remote and hence the assumption made above is very reasonable—making the tuning fork method a more convenient method in the field of checking the radar gun. All that remains is to determine a procedure which will assure that the tuning fork's frequency is right.

NBS recommended an equipment configuration for calibrating the radar gun's tuning fork that would be relatively easy to set up and operate, reasonably inexpensive, and yet with sufficient accuracy traceable to the primary frequency reference operated by NBS. The following is our first effort to achieve the above goals.

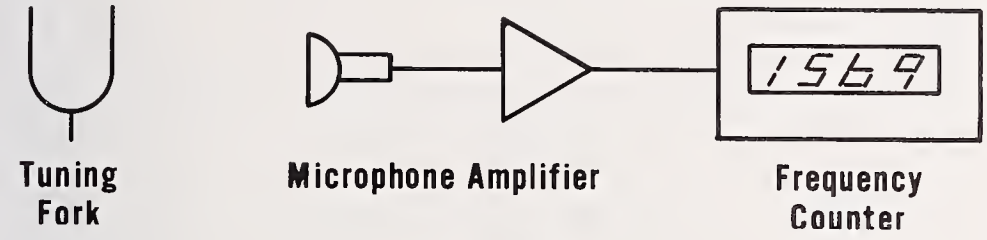


FIGURE 1

In figure 1 there remains the unresolved question of how does one know the reference frequency standard in the frequency counter is correct? Figure 2 shows a relatively inexpensive answer to this question:

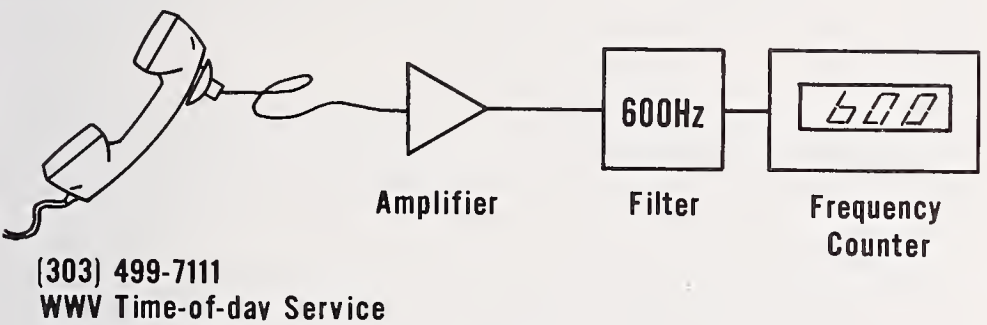


FIGURE 2

The format for the Standard Time and Frequncy broadcasts of NBS radio station WWV provides a continuous 600 Hz tone during every odd minute from 0 seconds to 45 seconds except for a 0.04 second hole where the second's tick occurs, and except for minutes 9, 45, 47, 49, and 51 of every hour. Using this method with the frequency counter set at a sample time of 1 second or a multiple of one second, one can calibrate the frequency counter to better than 0.4 percent as limited by current telephone frequency fidelity specifications. Only 1 percent accuracy is required for the tuning forks.

The equipment configurations in figures 1 and 2 have been tested for ease of use and for cross country telephone signal-to-noise problems on the telephone and were very satisfactory. The equipment cost of the components we used was about $500.00. A number of other, different equipment configurations are possible and acceptable if they guarantee traceability to NBS; e.g., by use of the

NBS Time Services either via telephone (figure 2) or via the radio station WWV.

The pilot program began in September 1974. Since that time over 200 forks have been tested for more than 40 law enforcement agencies in Colorado and from Wyoming. All of the tuning forks tested were found to oscillate within 5 Hz of the calculated (correct) frequency (less than 0.2 mph error).

The acceptance by the enforcement agencies is enthusiastic, particularly for those police departments having court difficulties. About 40 percent of all agencies contacted quickly responded and have had their tuning forks calibrated. About 10 percent of the departments have indicated interest and their forks are slowly coming in. Forty-eight percent either did not have radar units or did not have tuning forks for the radar units. Two percent did not find it important to have the forks calibrated.

Tolerances have not been developed for tuning forks as of this writing. A tolerance of about ± 1 mph seems acceptable which corresponds to ± 31 Hz for a 10 525 MHz radar gun. Most of the tuning forks tested had a frequency averaging 2/10 of 1 percent in excess of the calculated frequency for that particular speed. Note: this slightly higher frequency is shaded to be a slight advantage to the violator.

Reports have been received from several police officers that attorneys in court are starting to question the accuracy of tuning forks that appear to be damaged, referring to the scars appearing on the forks from striking the unit to make it "ring." Nearly all the forks tested by the Colorado laboratory bear these marks.

The frequencies of the Colorado tuning forks were within 5 Hz of the calculated frequencies (same as new forks).

Two forks were tested that appeared to have been run over or possibly dropped from a moving vehicle. Yet when testing the forks, the output of each was within 5 Hz of the correct frequency!

Several forks, when presented for test, did not bear serial numbers or identification. The units were tested and the frequencies recorded. Next, each fork was stenciled with appropriate identification. Markings were placed below the tines and just above the handle. The forks were retested under the same test conditions. The frequencies did not change even though this may be interpreted as a scarring of the forks.

Temperature tests were conducted on five different forks with temperatures ranging from 0° F to 110° F. The average change in miles per hour was only 0.69 mph for the 110° F span. The data for four of these is plotted in figure 3.

Overall, the tuning fork appears to be a very stable standard and suitable for the use intended.

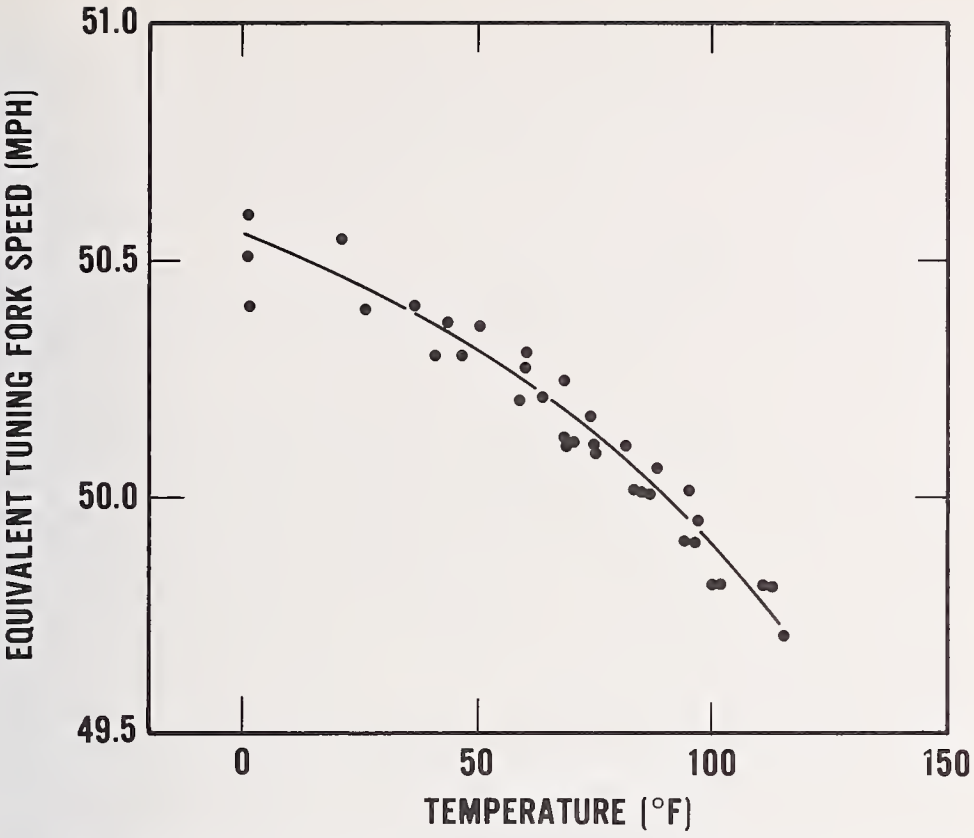


FIGURE 3. *Equivalent radar gun speed versus temperature for 4 different 50 mph tuning forks. These were typical tuning forks which are used to check a radar gun.*

Calibration of the frequency counter using the 600 Hz tone derived from the NBS, WWV telephone line has proven itself totally adequate. The largest errors encountered have been ± 2 Hz (less than ± 0.1 mph). Note: the telephone signal automatically "hangs up" after 3 minutes, so one should carefully note the WWV format given in the text under figure 2 before calling (303) 499–7111.

We have received informal reports that significant litigation cost savings are realized when the law enforcement officer produces an official calibration certificate which has ultimate traceability to NBS.

DISCUSSION

MR. R. L. THOMPSON (Maryland): Are you familiar with what they are calling Vascar?

MR. D. W. ALLAN (NBS): Yes, some.

MR. THOMPSON: Is this appropriate for that type of system?

MR. ALLAN: It is not. It is a totally different system.

MR. THOMPSON. Thank you.

MR. C. WOOTEN (Florida): You mentioned giving a certificate on this.

Mr. Allan: Pardon me?

Mr. Wooten: A certificate, a certification. Did I misunderstand you that you certify these?

Mr. Allan: That is right. We give written certificates.

Mr. Wooten: What we receive on weights is a report of test. Is that the same as a certificate?

Mr. Allan: Basically.

Mr. Wooten: I have no further question on that, then. Now, if you calibrate one of these turning forks, what is the life of that calibration?

Mr. Allan: That is a good question. It seems that these tuning forks are very rugged. In fact, we have measured some that apparently were run over and bent, and it seems that they have a very high fidelity in maintaining their frequency. Within the 1 percent tolerance, they are quite acceptable; and from year to year you will see essentially no change.

Mr. Wooten: Will this particular gun stand up in court?

Mr. Allan: Will the gun?

Mr. Wooten: Yes.

Mr. Allan: We have seen several instances where certificates have been taken to court for verification of the calibration of the tuning forks and it has helped quite a bit. As far as the gun itself, we are not certifying the gun. If people will raise questions about the inward parts of the gun and electronics, then they must raise those with the manufacturer.

Mr. Wooten: So, there is always a question, then, of accuracy?

Mr. Allan: There is, to some degree. This question also has been asked and when you look at it in detail, if the tuning fork gives you the correct reading, the chances of having an erroneous reading from a moving vehicle are essentially zero. It is either working or it is not.

Mr. Wooten: Thank you.

Mr. J. R. Bird (New Jersey): We are trying to get into this, as Harry Johnson is aware of. We are trying to get the funds through the Highway Safety Act to get this equipment. I am waiting on a response from them now to get this. In response to Mr. Wooten and to Dick Thompson, I am quite happy to announce that within the past month we were sustained in the Superior Court in New Jersey for our certificates. They now become prima facie evidence in court; and we do not have to go and testify to the accuracy of the equipment that we have calibrated or explain the circumstances. This particular substantiation was involved in a Vascar case where we had laid out and certified the base half-mile/mile courses for the State police and certified the stopwatches they used in calibrating those devices.

Mr. Allan: Very good.

Mr. G. H. Fishman (J. B. Dee & Co.): The point I am trying to bring out is if you are fined on the basis of this gun, money changes hands. Consequently, I am asking you if this makes the gun a commercial device and if it requires that it be certified?

Mr. Allan: The gun itself?

Mr. Fishman: Yes, sir.

Mr. Allan: I really cannot give you the legal implications of that. All I know from the history is that tuning fork calibration has been adequate. The tuning fork is a part of the radar gun system. When you buy a gun, the companies supply the forks in the same kit as a part of the calibration procedure. That is a part of the industrial certification that they give you, that the gun is working if you get this number with this fork; and I suspect that that is probably part of a commercial instrument, but I really cannot answer your question in full detail.

Mr. Fishman: Okay, sir. Thank you.

Mr. J. H. Akey (Wausau, Wisconsin): Our local police force is using a radar type device which does not need a tuning fork for calibration. It has a built-in checking factor. By just pressing a button, you get a particular readout. Are you familiar with this type of radar device; and, if so, how are these calibrated?

Mr. Allan: I have not seen that particular unit. There is a check position on many counters, and there must be a reference standard there. Probably what happens when you put it in this check position is that you cause some oscillator to vibrate to give you a particular frequency. It has to be that way. That is how it works. I mean, those are fundamentals, and at some point that unit has to be calibrated. You cannot get something for nothing.

Mr. L. D. Draghetti (Agawam, Massachusetts): When you calibrate a radar gun at 50 miles an hour, the tuning fork is set for 50 miles an hour. What is the possibility of the gun being inaccurate at, say, 40 miles an hour?

Mr. Allan: In other words, is it linear?

Mr. Draghetti: Yes.

Mr. Allan: The physics involved say it has got to be linear, unless there is something which is extremely pathological in the gun, which would probably indicate other problems as well. It has to be linear. It has to be right at 40 if it is right at 50.

Mr. Draghetti: I see.

Mr. Allan: The equation itself is a linear equation; and if it works, it has got to be linear.

Mr. S. Darsey (Florida): Are any variables involved with the type of metal and the size of the vehicle; for instance, a Corvette that has a plastic body versus a motorcycle or a big truck or an

aluminum vehicle, against a ferrous-type of metal? Are these variables in this thing?

Mr. Allan: Yes, they are. I personally do not have experience with the radar guns doing this; but having a background of physics, knowing that it is a microwave signal and that it bounces off a reflecting surface, it is those surfaces and the size of the surface that determines how much signal you get back. It is a signal to noise problem at microwave. So, the larger the surface, the better the signal to noise, and it has also got to be the right kind of surface. Essentially what it boils down to, at 10.525 GHz, is that most of your metals are excellent reflectors. Plastic is lousy. In other words, if you have a big truck alongside a Corvette with a plastic body and he is really racing along, you probably will not see him.

Mr. Darsey: You do not calibrate these, then, based on the type of vehicle you have? In other words, a truck makes no more difference than a car?

Mr. Allan: No. The police officer in court is going to have to say that he, in fact, was pointing the gun and he was discriminating between one vehicle and another. He knows the gun itself has about an eight degree angle of acceptance.

Mr. Akey: Approximately how many tuning forks were checked, how many were certified, and how many were found to be in error?

Mr. Allan: In this pilot program, the Colorado State metrologists sent out to all of the police departments in the State of Colorado invitations to send in their tuning forks. Let me give you the numbers from his report. He has a paragraph here that indicates the results. It says the acceptance by the enforcement agencies is enthusiastic particularly for those police departments having court difficulties. About 40 percent of all agencies contacted quickly responded and have had their tuning forks calibrated. This number is in the vicinity of 100 total, some of which are from Wyoming. About 10 percent of the departments have indicated interest and their forks are slowly coming in. Forty-eight percent either did not have radar units or did not have tuning forks for radar units. Two percent did not find it important to have the forks calibrated. So, that is basically our response in the pilot program.

Mr. Akey: The question was how many of the tuning forks that were calibrated were. . .

Mr. Allan: You said that and I did not finish the question. As I recall, and again I wish Frank were here—if Earl can remember? Six tuning forks were outside. Was that 1 percent or what?

Mr. E. Prideaux (Colorado): I think it was about 1 percent or 2 percent.

Mr. Allan: If you are off 15 Hz, it can read one way or the other. If you are off 15 Hz, it can read, for example, 51 miles an hour as well as 50 miles an hour.

Mr. W. I. Thompson (Monmouth County, New Jersey): I wonder if you could explain the principle of these so-called antiradar outfits that are being sold in some of the motor magazine ads.

Mr. Allan: Well, there are various kinds of devices. One is an alarm so that you know there is radar in the vicinity. All it is is a good receiver. It receives a 10.525 GHz signal. A light comes on or a buzzer flashes or something that could tell you to look out. Another thing that people do that is effective is to have a lot of moving metal. I have heard the story of people putting aluminum foil in plastic hubcaps so that it flips around inside. Again, it is a signal to noise problem. You have got to have enough moving metal to overcome all of the other solid moving metal that is moving at the same velocity. But there are various kinds of these tricks that people, I suppose, have tried. I am not aware of all of their tactics, but these are examples.

Mr. J. Douglas (Douglas Equipment Company, Inc.): I would like to know if it is truly possible for the Highway Patrol, with radar coming in your direction and you going in the other direction, to actually measure the speed that you are traveling when you are going toward him?

Mr. Allan: You are both moving? Both the vehicles are moving?

Mr. Douglas: Right, right.

Mr. Allan: You measure the relative speed.

Mr. Douglas: How can he do it?

Mr. Allan: Well, again, the principle involved is a matter of a reflected microwave signal between the two vehicles.

Mr. Douglas: Well, I have talked to people in our State on the Highway Patrol and they say it is not possible. Yet, they use those machines to do it, and they will nail you for it.

Mr. Allan: The thing that I would worry about in that situation is that they are made to be stationary. They do make a moving vehicle radar system, but it is a much more complicated system and this is not what we are talking about. The radar gun that we are talking about is made to be stationary for the following reason: The radar signal goes out and is reflected from the moving vehicle. A moving vehicle is the only thing that will give you a frequency different from that you send out. Now, in the environment there are many other cars that are stationary and he (operator of the gun) is stationary. Those cars will also reflect signals, but they are on the same frequency that he sent out.

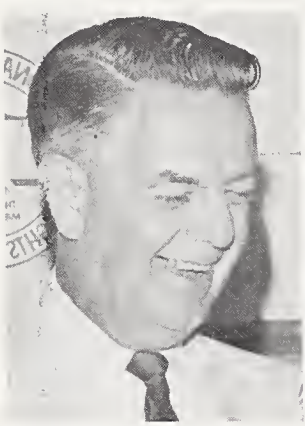
The radar gun has the capacity to discriminate between those frequencies that are different and those that are on the frequency that are sent out; so it can tell a moving vehicle relative to itself, but it cannot see vehicles that are stationary with respect to itself. So, if you are driving along the road and there are other cars along the side of the road that are also moving, this would foul up the system because I do not think it would work well. I do not know. I have not conducted that experiment.

GRAIN MOISTURE MEASUREMENTS AND THE WEIGHTS AND MEASURES COMMUNITY

by Frank E. Jones, Humidity Section, Heat Division, Institute for Basic Standards, National Bureau of Standards*

and

Dr. Carroll S. Brickenkamp, Office of Weights and Measures, Institute for Applied Technology, National Bureau of Standards



The most important factor in the trading of grain and the most important criterion in quality determination and pricing of grain is its moisture content. Moisture content determines storage and shipping qualities and is interrelated with other quality factors. Grain is traded by weight, therefore, the water in the grain is bought and sold at grain prices. For this reason alone, the measurement of the moisture content has a major economic impact. Grain and other similar agricultural commodities are traded on the basis of certain levels of allowed moisture content, the level depending on the particular commodity. The price paid to the farmer is reduced; that is, the farmer is "docked" if the moisture content exceeds these levels. The grain pricing structure requires greater accuracy in grain moisture measurement than the existing system of grain moisture meters provides. This fact is, of course, well known to the weights and measures official who has the responsibility for the testing of moisture meters in his particular state.

The problems associated with grain moisture measurement have been recognized at the National Bureau of Standards for some time. For example, Dr. Richard W. Roberts, past director of NBS, said in his remarks to the 58th National Conference, "There is currently

* Presentation was made by Mr. Jones.

no moisture measuring device on the market that can be depended upon to give accurate results at all times. The result is that there is no efficient method for testing grain moisture meters."

Dr. Betsy Ancker-Johnson, Assistant Secretary for Science and Technology, U.S. Department of Commerce, said at the 59th National Conference, "Accuracy determinations of instruments to measure moisture in grain are part of your basic mission to insure equity in the marketplace."

At the same conference, Dr. Arthur O. McCoubrey, director of the Institute for Basic Standards of NBS, mentioned that our microstudies of the National Measurement System revealed the real importance of determination of moisture in grain and that NBS was trying to find ways to help solve this problem.

In June 1974 we held a Moisture in Grain Workshop at NBS to which we invited participants from the grain industry, U.S. Department of Agriculture (USDA), and the weights and measures community. The objectives of the workshop were (1) to attempt to arrive at a consensus concerning the most urgent problems in the determination of moisture in grain, and (2) to obtain advice concerning the roles NBS should play. Mr. George Johnson of Kentucky and the late Mr. Edward Waggoner of California represented the weights and measures community. Mr. Johnson made an excellent presentation of the position of weights and measures officials. His remarks included the following points. Weights and measures officials are in the middle of the farmer-elevator situation and are looking to NBS for guidance. They need standards traceable to NBS, guidance in sampling procedures, performance standards with reasonable tolerances for moisture meters, recommended user requirements, maintenance procedures, specifications of environment of the meter, and uniform field test procedures covering the sample and range of grain moisture content.

Following the Moisture in Grain Workshop, the National Bureau of Standards has undertaken a Grain Moisture Measurements and Standards Program. In fact, there are two grain moisture programs at NBS. In the Institute for Basic Standards (IBS) the program is part of a broader Moisture Measurements and Standards Program. The Grain Moisture Program in the Institute for Applied Technology (IAT) is in the Office of Weights and Measures. There is very close cooperation between the programs.

The grain moisture programs at NBS include many diverse facets. We would like to present a progress report on the programs as they bear most directly on the weights and measures community.

One of the major efforts thus far has been on an early effective response to the pressing need for solutions to problems associated

with grain moisture meters and the testing of them by state weights and measures personnel. This effort is a cooperative one between the states and NBS.

The most numerous grain moisture meters in present use are "capacitance" devices which directly display moisture content or for which moisture content is determined from a dial reading and calibration charts. A number of the states have, incidentally, supplied us with data on the number of meters of various manufacturers in the states. This was in addition to responses from state weights and measures organizations to a questionnaire sent out by the Office of Weights and Measures. The response is greatly appreciated and the information is of considerable value to us.

The moisture meters are calibrated by the manufacturers (or by USDA in one case) using grain samples. The moisture content of the sample is determined by an oven-drying method. In this method, a portion of a sample of grain is weighed before and after drying in an oven, the difference in weight being taken as the amount of moisture in the portion of grain. Of course, there is a sampling problem. However, of even more fundamental significance is the fact that the oven method is not specific for moisture; that is, for example, other substances than water can be driven off. Also, not all of the water might be driven off.

Since the problems associated with grain moisture measurement vary from state to state, depending on specific crops and varieties, climate, personnel, resources, etc., it has been necessary for us to make visits to the states. On these visits we have learned a great deal which has helped us in developing the program outlined below. Table 1 illustrates the monetary value of water in the major grain and soybean crops in one of the midwest states. The value of the water in each crop is based on an assumed average moisture content. The last column shows the dockage loss due to a 1 percent error in the moisture measurement. "Docking" is the practice of reducing the price paid for the grain when its moisture content exceeds a specified value. For example, the price paid by an elevator operator to the farmer for corn is reduced by 1 percent for each 0.5 percent the moisture content exceeds 15.5 percent. Corresponding values for the first 14 states with which we had contact are also included in the table.

Table 2 illustrates the differences that exist between measurements made on commercial capacitance-type moisture meters. Measurements were made for three samples of South Carolina corn of moisture content (as determined by the Karl Fischer titration method) ranging from 15.4 percent to 24.5 percent. The maximum difference is seen to range between about 0.8 percent to 1.7 percent in moisture content. Also included in the table are moisture determinations

TABLE 1

IOWA

Crop	Production,[1] bu	Price/bu [1]	Value of crop	Value of water in crop [2]	Value of each 1% error
Wheat	837,000	$3.10	$ 2,595,000	$ 376,300	$ 51,900
Rye	104,000	1.60	166,000	24,100	3,320
Corn	1,204,200,000	2.35	2,829,870,000	537,675,000	56,597,000
Oats	63,600,000	1.05	66,780,000	9,683,000	1,336,000
Sorghum	1,898,000	2.07	3,929,000	727,000	78,580
Soybeans	268,600,000	5.65	1,517,590,000	220,050,000	30,352,000
			$4,420,900,000	$768,540,000	$88,420,000

Total crop value for 14 states $20,148,400,000
Value of water in crops $ 3,502,600,000
Value of each 1% error $ 403,000,000

[1] These data are for year 1973.

[2] Assumed average moisture contents are 14.5, 14.5, 19.0, 14.5, 18.5 and 14.5% on "wet" basis for crops in the order listed.

TABLE 2

SUMMARY OF MEASUREMENTS ON THREE CORN SAMPLES

Karl Fischer titration	Modified oven method (Wiley mill)	Official 72-hour oven method	Moisture meters			Maximum difference between meters
			A	B	C	
15.43	15.27	14.39	15.0	15.2	15.8	0.8
19.90	19.77	18.83	18.8	19.1	20.0	1.2
24.51	24.41	24.03	24.6	24.0	25.7	1.7

made by the official USDA oven-drying method and a modified oven procedure formulated by Mr. W. Haward Hunt of the Grain Division of the Agricultural Marketing Service of USDA. Note that the results for the modified procedure are in close agreement with the Karl Fischer results.

The Karl Fischer method is a chemical method involving reaction of water with iodine. The method is more nearly specific for water than are oven-drying methods. The water is extracted from ground grain by a solvent such as methanol and is reacted with iodine in the titrator. The availability of automatic Karl Fischer titrators has made it possible for personnel of limited formal technical training to use and apply the method.

We have evaluated the Karl Fischer method on a number of samples of grain. Our results indicate that the automatic titrators are sufficiently precise to serve as a laboratory reference method for testing moisture meters. However, to complete the evaluation of the method, we need much more data. We need the help of the states in acquiring this data. We are inviting the states to help us evaluate the method.

The program we are recommedning to the states has been designed to enable the weights and measures official to accomplish the testing of moisture meters used in commerce; for example, at grain elevators and grain dealer establishments. The testing is to be done using grain samples of known moisture content. The moisture content of the samples is to be determined in the state weights and measures laboratory by the USDA oven method, since the moisture meters have, in most cases, been calibrated by the manufacturer using the oven method, and by the Karl Fischer extraction method if the resources of the particular state permit. The grain samples are to be kept in sealed glass canning jars, refrigerated if the moisture content is sufficiently high that the sample would otherwise deteriorate. Samples with three different moisture contents of each grain of interest are to be taken to the field (again, refrigerated when necessary) and dumped into the moisture meter being tested, and measurements made in the manner prescribed by the manufacturer of the meter. The moisture content indicated by the meter or determined from the use of the appropriate calibration chart is to be compared with the known moisture content to ascertain the error in the meter measurement.

The program briefly outlined above should enable the weights and measures official to perform his duty of periodically inspecting and testing the grain moisture meters used for commerce within his jurisdiction. The official will be contributing at the same time to "cleaning up" or optimizing the grain moisture measurement system in his jurisdiction in a number of ways and will be contributing to the

education of the users of the meters. The equipment peripheral to the moisture meter itself will be inspected; that is, the scale used to weigh the grain sample, the thermometer used to measure the temperature of the sample and the calibration chart to be used with the particular meter will be tested or inspected. Also, the procedures used by the operator of the meter in making the meter measurements can be observed and suggestions as to improvements can be made.

The use of an automatic Karl Fischer titrator for determining the moisture content of the grain samples is optional. However, we encourage the states to: (1) acquire an automatic Karl Fischer titrator if their resources permit, (2) make moisture determinations on samples of grain grown in the state, by both the Karl Fischer method and USDA oven method, and provide us with the data, and (3) send samples of their particular crops to us.

We have advised the states concerning the equipment they would need to carry out the program and have prepared a draft of procedures. We have also set up a training program in the moisture laboratory at NBS in the use of automatic Karl Fischer titration equipment. Weights and measures personnel from several states have been trained in this program thus far.

At present, six States (Arkansas, California, Colorado, Kentucky, Pennsylvania and South Carolina) are actively involved in the experimental program in that they have or will acquire automatic titrators. An additional nine States (Georgia, Illoinis, Indiana, Iowa, Kansas, Missouri, Tennessee, Texas and Wisconsin) have expressed a serious interest in the field testing program. We have not as yet visited or been contacted by all of the states to which this program should be of interest. We anticipate that by the time this appears in print, other states will be involved.

I have talked thus far about a cooperative program between the states and NBS. We have also contacted the three major manufacturers of commercially used moisture meters about collaborating with us on an evaluation of automatic Karl Fischer titration for use as their reference method in the preparation of meter calibrations. Two of the manufacturers are interested in such a collaboration. Recently, we met with Mr. W. Hayward Hunt and Mr. Edward R. Liebe of the Grain Division of the Agricultural Marketing Service of USDA to discuss collaboration on an evaluation of automatic Karl Fischer titration. We have reached agreement on the collaborative effort.

Earlier in this session today, Mr. Ralph Barra discussed cooperation between the Federal Government, the states, and other segments of the community. I would like now to give two examples of the results of such cooperative effort in the grain moisture measurement programs. In the preparation of grain samples for Karl Fischer

titration there has been a need for a means of grinding grain in an extracting solvent (usually methanol) in a closed system to insure that neither the grain nor the solvent gains or loses (in the case of the grain) moisture from or to the atmosphere.

Dr. Robert J. Smith, of Corn Products Company International, knew of our need and suggested that we use a mixer/mill which he and his people had used with success in the preparation of corn samples for Karl Fischer titration. We acquired the mixer/mill. Dr. Leslie A. Guildner of NBS modified the container to provide an excellent seal, and the problem was solved.

As the second example of the results of cooperation, the State of South Carolina has been experimenting for about a year with transferring grain samples from their weights and measures laboratory into the field for use in testing grain moisture meters. They found that they could preserve high moisture grain samples for several days if they refrigerated them overnight between uses and for much longer periods if left in refrigerated storage continually. Coupling this information to us with our advice to them to use glass canning jars rather than plastic jars, a number of states have begun to experiment in their diverse climates and with different crop varieties to find a set of procedures which will preserve grain samples for use in the field for as long as possible or desirable. This example illustrates how cooperative efforts provide results much more quickly and effectively than we could attain them working separately.

Our job, yours and ours, is not finished. Not all of the problems are solved. We have not as yet evaluated the capability of or intercompared the many moisture meters used in commerce. This is one of the tasks we are encouraging the states to get involved in with us. Until it is known what existing meters are capable of in terms of moisture measurements (separated from their calibration charts), specifications and tolerances cannot be based on performance capability and, therefore, regulation based on unknown capabilities would be both premature and subject to change. For example, it is possible to set tolerances which none of the meters in a state can meet.

We realize that what we are suggesting to you is not strictly a modern regulatory function. However, it is a task that is so important to your states and to the national economy that you should be involved in it early. We ask you to help us improve grain moisture measurement and, therefore, contribute toward equity in the marketplace.

IMPACT OF ELECTRONICS IN WEIGHING

by John J. Elengo, Jr., Director of Engineering,
Revere Corporation of America, Wallingford, Connecticut

A few weeks ago, I was composing my thoughts on what impact electronics has had and will have in the field of weighing. I thought of the changing world around me. Could electronics really have an impact on the measurement of weight? Then it crossed my mind that the meter had been redefined to wavelengths of electromagnetic radiation and the second of time to a number of periods of electromagnetic radiation. Could redefinition of the kilogram be far behind? I opened my desk drawer and glanced down at my good old friend—a log log deci-trig slide rule. Right next to that slide rule was my shiny new, super, all engineering function, solid state, electronic calculator. I purchased it during a bargain sale at the local discount house. I spent a few nights learning all about it. I wonder if anyone is left with a warehouse full of log log deci-trig slide rules?

The old saying "the only certain things in life are death and taxes" is wrong! There is another certainty and that is change—changing times—changing technology.

Fortunately, as I look about, I realize that this is nothing new to Americans—we thrive on technological change! It is a natural part of our life. We rise to the challenge, then reap the benefits which result. Each of us recognizes that any occupation incorporates the need to keep abreast. Our schools—primary, secondary, and advanced—give us the basic fundamentals to allow technical growth with each new experience.

Stop and think of a few things that have significantly affected our lives as a result of electrical development. Consider the benefit which has been brought about. How would your home life be today without the light bulb, the telephone, and the television set? Would our factories have to be located alongside rivers and be equipped with overhead belts for running power to each machine? As it has enriched our lives, electronics has enriched and will continue to enrich the field of weighing.

WHERE HAVE WE BEEN? WHERE ARE WE TODAY? WHERE ARE WE GOING?

We have come a long way through the centuries. I don't know when weighing was first affected by technological change, but I as-

sume it started when the first customer being traded material by weight decided that he was coming out short and demanded improvement. Fortunately, the concerns of our century are substantially past the need to weigh more accurately and are more dedicated to improvements in weighing efficiency, data collection, and the more efficient control of assets through weighing. We can thank our forefathers, for the most part, for development and fine tuning of systems of levers, bearings, and weigh beams. A testimony to their efforts is the fact that here in 1975 scales possessing this method of construction still hold the majority of the marketplace. Today's manufacturing engineering technology continues to make the mechanical scale a viable product. However, the state of natural resources in the world and the rising cost of labor is beginning to effect the economic balance between the mechanical and electronic worlds.

With respect to resources, the rising price of iron and steel is driving the cost of lever scale assemblies ever up. Rising labor costs associated with intricate fabrications and construction are demanding that these activities be minimized.

On the other hand, electronic resources, heretofore victim to the high cost of development, are becoming less and less costly as a result of paying off those costs. For instance, today's transistor radio is available at only a fraction of its cost at early introduction. Large Scale Integrated (LSI) circuit components provide a single package containing hundreds of diodes, resistors, and transistors. Their cost is the same or less than that of a single transistor at early rates.

The discovery of electricity has had a pronounced effect on the lives of everyone. So, it is only normal that it should have a far reaching effect in the field of weighing. Professor William Thomas, better known to the world as Lord Kelvin, reported in 1856 that certain wires supporting a weight changed their electrical resistance as the weight changed. In 1938, Simmonds of the California Institute of Technology and Ruge of the Massachusetts Institute of Technology almost simultaneously perfected a method of bonding fine wires to a surface in such a manner as to be electrically isolated, but in such intimate mechanical contact as to respond precisely to the movements of that surface. Shortly thereafter both Ruge and Thurston of Cox and Stevens began to address themselves to the application of this technology to the field of weighing and the strain gage load cell began its rise to prominence. An infant technology?—I guess so, by comparison to techniques pioneered by the Egyptians, Greeks and Romans; but the modern load cell is a tribute to the technological efforts of many allied industries. The developments of high quality tool steels and their heat treatment, the developments of insulating materials and adhesives, all employed in the manufacture of load cells, are nearly equivalent infant technologies. Yet, these tech-

nologies are basic to our modern way of life; so in retrospect, load cell technology has been around for a while.

The strain gage load cell offered and continues to offer a compact, rugged weight or force sensing means, thereby negating the necessity for massive levers in medium and high capacity scales. The electronic readout indicators, even the first ones, are compact and generally readily transportable. As a result, the first major influx of electronic weighing apparatus came in the field of aircraft weighing during World War II—bring the scale to the aircraft, not the aircraft to the scale.

I am certain that most of you are familiar enough with electronic scales to understand their functioning without dwelling on details. The load cell produces an output voltage proportional to load. This voltage is referred to as an analog voltage, because it is continuously variable with load. The modern electronic weight indicator receives that voltage, amplifies it, and converts it from analog form to digital form; that is, an electrical signal which varies in discreet steps and can be presented as an arabic number on a display. One common method of analog-to-digital conversion is "dual-slope integration." A capacitor is charged for a given period of time at a charge rate which is proportional to the load voltage. The amount of charge received is, therefore, also proportional to load. Next, the capacitor is discharged at a constant discharge rate determined by an internal precision reference voltage. The discharge time, therefore, varies dependent on the amount of charge originally received and thus is proportional to load. During this discharge period, an electronic "clock" issues equally spaced pulses. These are counted and the result displayed. By choosing the appropriate circuit components, the display reads directly in correct engineering units.

Each clock pulse advances an electronic counter which codes the number by producing a given voltage on selected electrical lines arranged in a Binary Decimal Code. Unselected lines within the arrangement are not energized. Therefore, the digital signal is "on-off" in nature, and the need for precise voltage level determination is eliminated. This enables positive identification of bits and allows for the processing of digital weight information with a higher degree of accuracy than prevously attainable.

Today, rising costs of materials make precise weighing more and more desirable, not only in the sale of consumable products, but in their processing. So, it has been in recent years that basic industries as iron and steel, food, pharmaceutical, chemical and transportation have looked to the incorporation of electronic weighing to improve efficiency and reduce costs.

The compactness of the electronic weight sensor has enabled its placement in even the tightest location of a manufacturing process.

Here, often the electronic weight signal is employed to control inventories, productivity and scrap. This has resulted in operating efficiencies. Often this data is tied directly into computer systems and also serves to cause the actuation of pumps, valves, and alarms. Operators or computers can "dial in" the formula for a multiingredient batch, initiate a start command and sit back while an automated electronic weighing system takes over—sequencing material in the proper sequence, feeding fast for speed, dribbling the last little bit slow for accuracy of cut-off, compensating for material already past the shut-off valve, but yet in transit, and checking the tolerance of the final delivered quantity. It would be difficult to envision the size and complexity of a mechanical equivalent to this electronic scale means.

As to where we are going, we need only to look about. Has your local butcher gone electronic yet? Many have. It's a natural in a computing scale. Many new electronic industrial platform scales offer low height, portability, and eliminate the necessity of constructing pits. Electronics has increased the speed and improved the accuracy of checkweighing and classification.

Let's take a quick look at the growth of electronic weighing over the past decade. Working on a basis of load cell units placed in service, let's establish our base index of reference at 100 for the units placed in service in 1963. Consider the following growth:

Year	*Units—1963 Based Index*
1963	100
1967	135
1971	200
1972	235
1973	345
1974	425

In just the past three years, we have seen the volume rate of load cell units placed in service double.

We are witnesses to a major evolution in the field of electronics and weighing. This evolution is in its infancy as is yet the electronic evolution itself. The sensitivity and stability of electronic measuring circuits will advance to the state where resolutions of one in two hundred thousand are practical. The employment of such resolution will be limited by physical parameters other than electrical. The cost of logic decisions associated with process weighing, already at a fraction of the cost of a few years ago, will continue to be lowered by orders of magnitude. Complex instrumentation and control circuitry will be reduced to a few groupings of electrical components called Large Scale Integrated (LSI) arrays. The result is the elimination of hundreds and thousands of interconnecting wires and the

labor associated with assembling and troubleshooting. In more sophisticated weighing systems, power requirements, already reduced from the high consumption rate of thermoionic vacuum tubes to the low consumption rate of transistors, will be reduced even lower. This miniaturization of circuitry and reduction in heat generation will result in a decrease in overall size of the electronic scale package. Low cost load cell/flexure arrangements will replace lever systems, particularly in bench scales.

WHAT ARE SOME OF THE PROBLEMS THAT WE FACE AS A RESULT OF ELECTRONICS IN WEIGHING?

If you do not have an electrical or electronic background, listen closely. One of our past Presidents said: "We have nothing to fear, but fear itself." I wish to emphasize the word "we"—I have a secret. Although I am addressing myself to the impact of electronics, my training is in mechanical engineering. Probably the first hurdle to cross in becoming familiar with electronic weighing is to apply a basic understanding of the science of electricity to the products at hand. Too often, we tend to shy away from becoming familiar with an electronic device, because we view it as a mysterious black box. We are afraid to understand its basic method of functioning as it might be too sophisticated; this is not so! We need only understand the details of a simple functional block diagram and should not allow the intricacies of the detailed circuitry to overcome us.

The second hurdle to cross is the "electronic language barrier. Sure any new technology has some new words to learn, but generally they are just new language applied to old common sense functions. I supervise many electronic engineers. Most of the time I find myself saying, "Okay, now say it again, but this time explain it to me in ordinary layman common sense terms." I think we all have been around enough to have learned that every different industry which uses scales has its own industry jargon—but, after visiting an installation one or two times, you find yourself using their terms too.

I suppose the next generation of scale men will have less difficulty. They are exposed to electronics at home and in school right from the start. But, if today's generation is going to hold its own competing for advancement as tomorrow's generation arrives, and it is already arriving, then what is needed is a bit of self-motivation to accept the natural challenge which technological change brings and climb on board.

HOW DOES ONE ADAPT TO THE TECHNOLOGY OF ELECTRONIC SCALES?

Once anyone gains exposure to a new technology, what once might have been a special consideration becomes common sense when under-

stood and put into regular practice. Surely, you would not expect the same performance from a scale significantly out-of-level as you would from the same scale properly leveled. So too, with the conversion of weighing equipment from mechanical technology to electronic technology, there are some special considerations to be learned and, in time, they too will become common sense.

For instance, by now, we are all familiar enough with electrical power distribution to know that all sources of energy are not of the same quality. Often in industrial environments, high current motors are regularly switched on and off. During switching, the power line can undergo abnormal electrical transients. For this reason, the electronic scale is connected to a separate circuit normally shared only by plant lighting. A simple enough consideration for a precision scale and certainly no more demanding than finding a level place to set a scale down, but one that has to be recognized by the equipment designer, installer, and user. The designer incorporates circuitry to provide for accurate performance under normal line fluctuations. The installer insures that the equipment is installed in accordance with the designer's recommendations to prevent misoperation. The user follows the correct operating procedure and maintains the equipment in good working order by performing regular preventive maintenance service. The result of this mutual technical understanding is a successfully operating scale.

Recently, there has been much discussion concerning the effects of Radio Frequency Interference, commonly referred to as RFI, on electronic scales. An incident was noticed that a scale read incorrectly when a mobile transmitter was operated nearby. Other similar incidents are reported in other parts of the country. Concern sets in —and rightly so. Is their a need to gain new understanding on the part of the designer, the installer, or the user? Where does the weights and measures official, as the guardian of the public, fit in this matter?

Certainly, radio waves have been around long before the first electronic scale. Why should they present any more of a problem now than previously? We understand the effects they produce and the corrective measures which must be incorporated to tolerate their presence.

In simplicity, the radio wave, which is an alternating current voltage, can be picked up on interconnecting wiring or power lines and carried to the electrical components within a scale enclosure. Some electrical components are capable of rectifying these signals, and the resulting voltage can destroy the accuracy of an electrical weight signal, if not suppressed. In the same simplicity as above, suppression is achieved by utilizing shielded interconnecting cables, proper grounding of the scale instrumentation system, and incorporating

circuits which bypass the radio signal before it reaches any component which will rectify it or impress it on the weight signal. This technology is not new in the field of electronics. It was perfected during World War II for the protection of military electronic devices and has been used extensively by many electronic scale manufacturers.

Because not all electronic scales have been adequately provided with means to prevent radio frequency interference, its effects have been observed in all too many instances and have raised just concern. Recognizing the need to provide weights and measures official with an understanding of the problem and a means of determining that a scale is adequately protected against RFI, the Scale Manufacturers Association has formed a committee to prepare recommendations for consideration by the Committee on Specifications and Tolerances of this body by the time of their interim meeting next January.

In closing, may I challenge you once again lest you too become caught with a warehouse full of log log deci-trig slide rules. We are scale men first and that is our expertise. Regardless of how that weighment is technically performed, we are experts in obtaining correct weighments. With a little effort and self-motivation keeping up with the change from purely mechanical to electromechanical to electronic weighing will be easy and painless, interesting and rewarding.

TUESDAY EVENING—JULY 15, 1975

ASSOCIATE MEMBERSHIP RECEPTION

The Associate Membership Committee hosted a reception on Tuesday evening for the enjoyment of Conference delegates. This reception was sponsored by contributions from the associate members. Photographs of the reception and representatives of the sponsors are shown.

MORNING SESSION—WEDNESDAY, JULY 16, 1975

(H. E. Sandel, *Vice Chairman*, Presiding)

WEIGHTS AND MEASURES AND THE CONSUMER

by Maynard H. Becker, Director, Department of Weights and Measures, Los Angeles County, California

Throughout the ages of man there have been three general continuous quests:

1. For the fountain of youth
2. For an eternal life
3. For a formula which will grow hair on a man's head.

The possibilities of such achievements and the social implications are undoubtedly interesting, but equally interesting and currently more practical is the continuous economic protection provided to millions of consumers by their local weights and measures officials throughout the United States.

I would like to begin by briefly reviewing weights and measures activities from the past to the present as they relate to the consumer. As you may know, weights and measures is one of the oldest forms of consumer protection.

In my opinion, weights and measures activities in the United States are in four stages of development or transition. I have identified these stages as:

1. The Service Stage
2. The Regulatory Stage
3. The Enforcement Stage
4. The Administrative Technology Stage

When weights and measures initially received its start in the United States, the only knowledgeable people in the field of commercial weighing and measuring were the weights and measures device manufacturers and the device repair and service personnel. The Service Stage was implemented at this time. It was only natural that the first nucleus of weights and measures inspectors would be from the service and repair people. As a result weights and measures activities were performed more as a service agency to the weighing and measuring device owner. Repairs and adjustments to inaccurate equipment were often made by the weights and measures inspectors.

Indeed, this service method was more often the most expedient way of getting the job done. Package inspection was at a minimum.

Next, the Regulatory Stage began to appear. As time passed and economic and other conditions changed, there was a gradual change to the regulatory approach to weights and measures activities. The regulatory approach placed emphasis on determining whether or not weighing and measuring equipment and packaged commodities were accurate at the time of inspection. Inaccurate devices were now tagged out of order and inaccurate commodities ordered off sale. Repairs, adjustments and other corrections were left up to the merchant whose equipment or packages were found to be in violation of local or state laws and regulations. During the regulatory period it became very apparent that a tremendous growth in packaged commodities was taking place.

The Enforcement Stage represents that period when some weights and measures jurisdictions began to hold the merchant responsible and accountable for inaccurate weighing and measuring equipment and for packaged commodities which were found to be short weight or short measure. By this time in many areas throughout the United States, service and repair companies were now capable of providing preventive maintenance service for the weighing and measuring equipment used by business and industry. Commensurate with this concept of responsibility and accountability is the admonishment or prosecution of violators of weights and measures laws and regulations.

The last stage is that of Administrative Technology. This stage concerns itself with the weights and measures official using and applying the latest developments in management techniques to the functions of his organization. Increased costs of everything, including labor, material, taxes, etc., mandate that every organization, and particularly government, provide the best service or enforcement possible with the financial resources available.

No knowledgeable person adopts a plan of insuring himself or his possessions against loss or disaster without first comparing the cost of such protection as it relates to anticipated benefits. This same analysis also applies to the protective enforcement activities of weights and measures programs.

One of the objectives of a government program is that it respond to the needs of the people. When taxpayers of a state, county or city invest a certain portion of their tax dollars to prevent their receiving short weight or short measure, they have a right to realize savings from enforcement activities in excess of the cost of the enforcement programs.

Today, many progressive weights and measures officials are carefully and assiduously applying cost-benefit analysis to their tradi-

tional weights and measures programs. In my opinion, the stage of Administrative Technology will initiate more challenges and changes to the traditional approach to weights and measures than have taken place in the last fifty years.

WHAT WEIGHTS AND MEASURES DOES FOR THE CONSUMER

The term "weights and measures" may mean different things to different people. In a philosophical sense it means that equity shall prevail in all commercial transactions involving determination of weight, measure, or count. To the merchant, it may mean assurance of fair competition, that both he and his competitor are required to sell a full pound, gallon or count. On the other hand, to the merchant it may mean just another level of government interference with free enterprise. To the consumer, it may mean assurance of receiving correct weight, measure, or count at the marketplace. To the taxpayer, "Weights and measures—what's that? No wonder our taxes are so high!"

Throughout the United States, various weights and measures officials are charged with the enforcement of state or local laws pertaining to weights and measures. Adequate and proper enforcement of these laws is necessary to protect the pocketbook of each and every consumer. What most consumers take for granted—a full gallon of gasoline, a full pound of coffee, butter or bacon—are the results of weights and measures inspection and enforcement activities.

In general, your weights and measures official provides consumer protection through five major programs of enforcement. The inspection of commercially used weighing and measuring devices; the statistical sampling and inspection for label and content accuracy of various packaged commodities; a test purchase program for determining accurate use of the device and the correct extension of prices charged; the investigation of consumer complaints; and last, providing consumers with educational material relative to weights and measures matters and directing consumers' attention to proposed legislation which is not in the consumers' best interest.

Inspection of the various weighing devices is generally accomplished by going to the many places of business and placing varying amounts of test weights upon the scale to be tested. If the scale does not pass inspection, it is tagged out of order, and the merchant cannot use the device until repairs have been made and the scale retested.

Examples of scales tested include those used to weigh drug prescriptions, candy, food items, building materials, truckloads of commodities and many other items weighed at time of sale, or for the determination of a weight on which a charge for a service is based.

Most metering devices are inspected by passing through the meter the commodity to be measured. For example, a gasoline dispenser at a service station is inspected by actually delivering a series of five gallons of gasoline, as determined by the meter reading, into an accurately calibrated five-gallon measure or container. The amount of gasoline delivered into the container is compared with the meter reading to determine the meter accuracy. Other meters inspected by your weights and measures official include those used to measure water, oil, cryogenic liquids, electricity, and gas vapor.

There are still other meters for measuring distance and time, such as taximeters, odometers on tow trucks, ambulances and rental cars; as well as parking lot timeclocks; parking meters; laundromat timers on dryers and other timers. Again, inaccurate meters like inaccurate scales are tagged out of order. Since the use or possession of an inaccurate weighing or measuring device generally constitutes a misdemeanor violation, admonishment of violators ranges from verbal warnings to court prosecution.

It is the practice of many weights and measures officials to place a paper seal on the device after inspection to indicate the device was accurate when inspected. In my opinion, such a seal tends to convey a false sense of security to both merchant and consumer by implying that the presence of the weights and measures seal guarantees accuracy from one weights and measures inspection to another. Such an assumption of accuracy is far from the truth.

While inspection of scales and meters constitutes one of the five major enforcement programs, the largest and most complex is the second program, that of packaged commodity inspection. If there is one area in which weights and measures has not kept pace, it is the tremendous avalanche of packaged commodities. Each man, woman and child purchases and consumes on the average each year 1,000 packaged items. In California alone that amounts to over 21 billion packages; 65.9 percent of the total commercial dollar trade involves packaged commodities.

Over the years the roles of the merchant and consumer have changed significantly. Today, the local merchant's shelves are stocked with hundreds of packaged products which were previously weighed or measured by the merchant at time of sale from his bulk supply of the product. Today when practically every food product, as well as most other merchandise, is sold in prepackaged form, the consumer is not present when the article he or she buys is weighed or measured. It has become increasingly the obligation of weights and measures officials to make sure that the consumer's interest in this type of transaction is safeguarded.

The revolution in the distribution of food has resulted in many changes. It has brought about mass production, with giant manufac-

turing and distributing agencies; it has brought fierce competition where only the most efficient may hope to survive; and with the efficiency has come the most searching cost-accounting procedures.

These cost-accounting methods emphasize that if the package contains an on-the-average quantity, however small, above that declared on the label, the resulting economic loss, when multiplied by the volume of modern production, becomes a truly substantial loss of money to the packer. By the same token, if the package contains an on-the-average quantity that is less than the declared amount, the consumer stands to have a substantial sum of money taken from him wrongfully.

Industry is constantly under competitive pressure to work as close to the declared weight or measure as possible. This fact is understandable, but with little or no margin for error it inevitably increases the chance for short weight or short measure to occur. Such a condition is particularly true when an industry has a weak or ineffective quantity control program.

To protect consumers from nonlabeled, mislabeled and short-weight or short-measure packages, weights and measures officials inspect hundreds of thousands of packaged commodities each year. Proper and informative label information can be easily verified from visual inspection. However, determination of accurate package contents requires the application of a sophisticated statistical sampling system based on an average concept. Simply stated, if the average content of the commodity being inspected equaled or exceeded the stated net content, the packages would pass inspection. If the average content were less than the stated amount, the packages would be placed off sale. When placed off sale, packages cannot be sold until they have been corrected by remarking them or adding sufficient product to make them acceptable.

For items weighed or measured at time of sale, such as delicatessen items, meat, produce, fruit, candy, gasoline, oil, etc., many weights and measures officials conduct test purchase programs. The test purchase method of inspection not only verifies the accuracy of the equipment used but the accuracy of the person performing the weighing or measuring, and in general will uncover any attempt to defraud the consumer.

In addition, thousands of consumer complaints are received and investigated by weights and measures officials. Generally all complaints are accepted including anonymous telephone calls and letters.

Lastly, weights and measures officials within their budget limitations will provide consumers with brochures, speakers and information through news releases relative to weights and measures matters. In particular, consumers are generally informed about pending legislation which the weights and measures official considers not to be in the best interest of the consumer.

WHAT CONSUMERS CAN DO FOR THEMSELVES

In concluding my presentation I will discuss what consumers can do for themselves and their local weights and measures official. There are a number of actions the consumer can take to protect himself or herself and to assist the local weights and measures officials. It is suggested to consumers that they continuously observe the various weighing and measuring procedures in their daily business transactions. Get out of your car and observe the delivery of gasoline and oil to your car. The checkstand operation, the candy store, the delicatessen and over-the-counter meat sales are but a few of the weighing and measuring transactions visible to the consumer. An honest and careful merchant should welcome his customer's participation in the sales transaction.

When purchasing sale items, consumers should pay particular attention that the sale price and not the regular price is charged. Many honest mistakes are made over sale items. Nevertheless, the loss to the consumer is the same whether or not the overcharge was intentional or inadvertent.

Those consumers interested in watching their household budget should take advantage of the store items that are unit priced. Price comparison of different sizes of the same brand of product will provide money-saving information. Carefully reading the package label and the net content statement will also provide information for an intelligent purchasing decision.

Consumers can assist their local weights and measures official by reporting to him possible weights and measures violations and supporting the annual budget request of the weights and measures department. Remember, your weights and measures official can protect you approximately 50 percent of the time. Consumer alertness should protect you the other 50 percent.

In closing, a continuing equity at the marketplace requires an effort on the part of both the weights and measures official and the consumer. Teaching a child to cross the street by telling the child to wait for the green light is but half the lesson. The child should also be taught to wait before crossing the street to see if the traffic will stop.

DISCUSSION

Ms. J. Kendall (Chicago Consumer Coalition): Mr. Becker, I would like to know if there is any consumer input into the panel, or whoever it is, that decides which new scales are the ones to be approved for use in the retail market.

Mr. M. H. Becker (Los Angeles County, California): There is none.

Ms. KENDALL: Is there any industry input? I am sure there is.

Mr. BECKER: Well, yes. The developers of new equipment, of course, in their sales programs and promotions attempt to sell these devices and systems to the various agencies which would use them.

Ms. KENDALL: I would like to suggest that somewhere along the line you do include consumers in this kind of decision making. We are the people who have to buy the things that are weighed by these scales in the supermarket. A few years ago we were in Washington at the Conference and brought up the fact that so many of these can be cheated upon electronically by different means and screwdrivers and what not. Now, with the new digital scales that are in mainly produce and delicatessen sections of the store, there is an easy method of cheating; and it is too easily explained by the person using the scale. That is where you can charge by the half pound or the quarter pound or the pound. Say, in a delicatessen counter you have a pound of potato salad for 69 cents and the person who used the scale before had it set for the price per half pound. This has happened to me personally. If they forget to readjust that thing, you will be paying $1.38, for instance, for a pound of potato salad that should be 69 cents—double. And it is so easy for the person to say, "Oh, gee. I just forgot to set it."

Why do you have to have it at the quarter pound or half pound? Why can it not just be price per pound?

Mr. BECKER: I would suggest that consumer groups having this interest should make their views known to the people who are using the equipment. In other words, if you do not feel that the type of equipment your local merchant has is in your best interest, I would suggest you make it known to him.

Ms. KENDALL: Yes, but we do not get to know that there is a digital scale coming along with all these things until it is in the store, and we see it, and it is there. Then it is always too late.

Mr. BECKER: Well, let me add this, if it is any comfort to you. These devices, at least in California, are approved. Nothing is entirely foolproof; and in our routine and intermittent spot checking, of course, we attempt to find any hankypanky that may be going on. As I discussed, under our test purchase program, any honest mistakes or intentional mistakes are found when we pose as customers and buy over the scales or any type of weighing and measuring device.

Ms. KENDALL: It seems to me that the Bureau's main function should be to see that the scales that are finally approved should provide the least chance for this kind of error rather than just making it easier. Thank you.

Mr. L. D. DRAGHETTI (Agawam, Massachusetts): Mr. Chairman, I am the inspector of weights and measures for the Town of Aga-

wam. In that capacity, I am also the consumer commissioner for the Town of Agawam; and I act in the dual capacity. I am sure there are a good many sealers in this auditorium right now that are acting in the same capacity. As far as the devices are concerned, the approval of type for their use in the State of Massachusetts must be certified first by our Director of Standards. I know, for example, the fellows from New Jersey would take exception, as I do, because there are many of us who are acting in a dual capacity in our own jurisdictions.

Mr. H. E. Sandel (San Bernardino County, California): Thank you. Syd, did you have some words of wisdom?

Mr. S. D. Andrews (Florida). I just have to take the opportunity to inform this young lady that this entire Conference is made up of weights and measures officials representing jurisdictions. As such, they are servants of the taxpayers, and we represent the consumers. But, balancing this is the industry people. We are here primarily to represent the consumers, and my boss would not tolerate me for one day if I did not stand up and represent the consumers. The fact that we are frequently referred to as the third man in commercial transactions is because we must be dedicated to fairness to both parties in the transaction, and to be fair does not necessarily mean that you are prejudiced one way or the other. Please, I hope you will accept the fact that this entire Conference is made up of representatives who are dedicated to protecting the consumer. You have one in your State and your county, and all you have to do is feed input to him. You are well represented, be assured.

REPRESENTING THE CONSUMER INTEREST IN WEIGHTS AND MEASURES LAW ENFORCEMENT

by Helen E. Nelson, Director, Center for Consumer Affairs, University of Wisconsin-Extension, Milwaukee, Wisconsin

What I want to do this morning is try to give you a little insight into the consumer movement as it is today, and then I'll try to state my own feelings about the problem that confronts us all: How to measure net weight.

THE STATE OF CONSUMER REPRESENTATION TODAY

Let me first talk about the state of consumer representation today so you will know who the cast of characters is. You have heard from one of them this morning, Jackie Kendall, speaking for a group of

young housewives in Chicago who have been working, in the consumer interest, with government and industry. Their work is primarily centered on the supermarket problem. I would guess they have been functioning for about five years.

Consumer organizations—consumer groups—are also taking shape at the national level. Consumers Union is one of the oldest consumer groups. It will celebrate its 40th anniversary next year. It is the issuer of *Consumer Reports*. It puts out about 2¼ million copies of that magazine every month. About 350,000 members vote in the annual election for the Board of Directors. Consumers Union has real influence in the marketplace and in the consumer movement.

Consumer Federation of America is a group of about 200 consumer organizations around the country that have federated together. They have offices in Washington with a staff of about five people. They represent the consumer interest in legislation in Congress and sometimes in the states. The annually convened membership meeting adopts a policy statement which guides the staff in the positions that they take throughout the ensuing year. Anybody can get a copy of their policy statement and know where they stand on a lot of issues.

The National Consumers League celebrated its 75th anniversary this year. Their primary interests are in the field of food and health.

The American Council on Consumer Interests is a professional organization of teachers, writers, economists, and people working in the field.

The National Consumers Congress came into being after the meat boycotts in the summer of 1972. Also headquartered in Washington, D.C., this group is organizing local groups with a grant from Consumers Union.

In Washington we also have the Nader-oriented centers. One is the Center for Science in the Public Interst, which concerns itself with the application of technology to the consumer interest.

So, as you can see, a good number of consumer organizations have come into being nationally and are functioning every day in the consumer interest, primarily by relating to government agencies.

Consumers Union has five attorneys in Washington and one in San Francisco whose chief activities are filing suits against governmental agencies to push them to do the things that the Board of Directors of Consumers Union feel are their responsibility. They have successfully moved the Veterans Administration, the Food and Drug Administration (FDA), and the Federal Reserve Board recently; and this will go on.

The western representative here in California sued the State Pharmacy Board and required them to drop their regulations which prohibit the advertising of drug prices.

So, the point of this as I see it is that the consumer movement is maturing. It is being served by professionals now, and it is going to be more and more a professional posture that you will find the consumer organizations taking.

There is also in-government representation for the consumer today. There are about 300 state and local consumer agencies in the country now. Some of you direct those. Many of you have the responsibility for weights and measures and consumer affairs too, as we heard this morning. In many others the two functions are not merged together; but the consumer agency is a complaint handling agency and a consumer advocacy agency without a regulatory responsibility. Both models occur.

At the Washington level, you know, you have Virginia Knauer's office, which now has over a million dollar budget. The government agency with the greatest authority to work in the consumers' behalf is Puerto Rico's. There we have an agency with a regulatory responsibility, an information service responsibility, and a budget of five million dollars.

The Congress will pass the consumer agency bill this year, which will put the consumer's name on several doors in Washington and budget it for some money. It remains to be seen what President Ford will do with it, but I expect that the closer we get to election, the more favorably he will look upon it.

The Federal Trade Commission (FTC), in its new amendments, has provided funds of a million dollars to permit consumers to appear before it, to participate in its hearings, to do research and present evidence for the Commission's consideration.

The Food and Drug Administration is more and more putting consumers on all of its committees, and it has a multitude.

Departments which are members of the energy task force in the Federal Government (there are five or six members such as Commerce and Transportation) are required by the President to have a consumer advisory council. So, we are now structuring government to get input from the consumer.

CENTER FOR CONSUMER AFFAIRS ACTIVITIES IN WEIGHTS AND MEASURES

This is another thing about which I wanted to report briefly to you. At the last meeting a year ago in Washington, I reported to you that our Wisconsin Center for Consumer Affairs had just taken over Leland Gordon's Center for Weights and Measures. In our first year's program we have done a few hopeful things.

First, we initiated a newsletter to go to these 300 consumer agencies around the country and to weights and measures people, if they wish. We are putting weights and measures news in this newsletter

for the consumer agency directors; and we are trying to educate the consumer agency directors about some of the issues on weights and measures.

Next, we had a conference just last week; a seminar for the directors of state and local agencies. We had a session on weights and measures and problems of net weight law enforcement. Mr. Charles Vincent from Dallas, Texas was on our program and Mr. Gene Smith from San Mateo County, California. So, you were well represented.

Also, we are trying to educate and inform some of the consumer group leaders about the issues in weights and measures so that these consumer groups can function effectively and at any level necessary when addressing themselves to weights and measures problems. Toward that end, we convened early this spring a meeting of representatives of each of the national organizations that I have enumerated and a designated representative from the U.S. Department of Agriculture (USDA), the Federal Trade Commission, a state sealer who is a committee member in the National Conference on Weights and Measures, and a city sealer who is an officer of a regional association. So we had government well represented, with the exception of FDA. The FDA could not spare anybody to come out and tell us what their program was or is, and thereby saved somebody from great embarrassment because their program is practically nil at this point.

We are going to issue a report of this two-day seminar, so it will go to more people than were able to participate.*

We learned a great deal about Washington's failure to share information with consumers. The fact is that no consumer, no anybody, is allowed to participate in the interagency meetings where problems of net weight law enforcement are being discussed among Federal agencies. No minutes are kept at the meetings; but our fate and maybe yours is being acted upon or is certainly being discussed.

The consumer groups took the fact that there was no record, that the meetings were not public, to be a slight, if not a slap.

We learned that the USDA's regulations were thrown out by the court as being too vague. We already knew that the FDA didn't have any. We learned that the Federal Trade Commission has taken action on only one product under the Fair Packaging and Labeling Act, under which they have a responsibility for all nonfood items. On soap, they simply told the soap manufacturers that every bar of soap had to weigh what it stated, and the soap manufacturers complied.

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* *Conference Report: Consumer Briefing on Net Weight Law Enforcement* is now available from the Center for Consumer Affairs, University of Wisconsin-Extension, 929 North Sixth Street, Milwaukee, Wisconsin 53203.

One of the people at our conference was a staff member from the Senate Commerce Committee. He said that his committe staff had made a study after the FTC took this action some time later. They made it before and after, and they could find no evidence of a price increase.

If there is any other concrete evidence of what happens when you make an industry package every item to weigh what the label says it weighs, I have never seen it; and I would certainly like to see it. We get talked to all the time about how this is going to cost the consumer money, but how much? Give us a price. Let us relate to the cost. Let us know how much it would cost. Don't just give us hyperbole that it will cost a lot.

CONSUMER LOSING TRADITIONAL BUYER'S RIGHTS

I would remind you that traditionally the consumer has had certain rights, as once all buyers had. Today, we find that other buyers still have these rights protected, yet the consumer is being deprived of them. Traditionally, the buyer has the right to examine the product. Now, on the commodity market, the big food companies still have that right. They can examine the agricultural products they buy or specify a certain government grade so they do not have to examine it. There is a whole orderly system in our marketplace which lets the buyer decide what he is going to buy and lets him know what he is buying before he has bought it—up to the point where you get to the consumer. The big buyers select by quality grades and by standards. The consumer has scarcely any of those buyer's rights left any more.

For example, the canned vegetable may come all the way to the retailer with a grade on it. Everybody knows the grade until it gets to the consumer, and then the consumer gets a pretty picture.

Another traditional buyer's right is the right to find out the price. As you heard from our first speaker this morning, that is getting harder and harder to do in the supermarket. That is why consumers struggled so hard to get unit pricing. Even where it was introduced, it is not being kept up to date on the shelves. Consumers have come to understand that we cannot rely on it. They are going to take us consumers still further into this void by taking off even the package price now.

Consumers and only consumers are losing this right to know what the price is in comparable units. Consumers, as buyers, are becoming second class citizens. The buyer has traditionally always named the quantity he wanted to buy. Every buyer still does that, except the consumer, and the consumer cannot do it. Traditionally, the buyer has always been able to make sure that he got full weight. Witness the Biblical injunction, "Let the buyer be present when the wine

is drawn." Now consumers have lost much of that right and are threatened with even greater loss of that right.

Consumers are not enjoying the traditional rights of buyers in the marketplace today—rights that other buyers higher up in the distribution channel do have. To remedy this situation—to restore these rights—consumers have to look to the weights and measures officials.

NET WEIGHT LAW ENFORCEMENT

The weights and measures people are about the favorite government agents of consumers. Few governmental officials, particularly in the regulatory processes, are held in as high esteem by consumers as are you weights and measures people. Your chairman points out that you represent the consumer. My response is, I sure hope so because we need it.

On the crucial matter of net weight law enforcement, I address you as law enforcement officials. That is what you are. One issue on net weight law enforcement is when are we going to determine net weight of packaged products? Are we going to determine it when packed or when it is exchanged between seller and buyer?

One of the first things I learned fifteen years ago about law enforcement in packaged goods transactions was that you cannot put on the box "weight when packed." Now, after all this, we look as if we might consider legalizing it. I think it is shocking.

You have also got the issue of how you are going to determine illegality, and then the very large issue of by whom it is going to be done. How you define legality and illegality of the amount of a product sold by weight or measure is of profound concern to consumers. A matter of such fundamental concern to all consumers—a matter of economic and legal justice both—cannot be "so technical that they could not understand it."

The legality of daily marketplace exchanges of money for goods touches every citizen. How is the consumer to maintain faith in our market economy if he or she is told by the law enforcement officials that it is legal to get less than the package states he or she is getting? Once you sanction shortweight but continue as law enforcement officers, the next challenge to you is inevitable. You will have to define "too short."

Will the Federal agencies preempt the field? The USDA is already trying to in their enforcement of the Wholesale Meat Inspection Act of 1967. The FTC takes the position that they do preempt. They will yield to a state law only when it gives the consumer more protection than their regulation does.

So, we have got a real threat from the Federal agencies as far as who is going to do the law enforcement. I think consumers would

give more credence to their local weights and measures officials checking in the retail store than they would to USDA checking in the plant of the packer.

Consumers do not put uniformity as high on their priority list as maybe law enforcement people do; and I can see how law enforcement people would. Consumers tend to fear uniformity of some kinds. They fear that it will be uniformity at the lowest common denominator. I think their instinct is if we are going to have uniformity, we better have it be Federal regulation because we can watch those boys better; and there is one site of decision instead of the thousands of sites that we have now.

I am really very hopeful that the National Conference on Weights and Measures, made up of state and local enforcement officials, can rise to the challenge this year.

One final plea, I think I heard correctly this morning that the Executive Committee's report recommended, and you did adopt, a proposal that there will be an industry committee to meet to bring industry's view to the Conference. I am going to be bold enough to suggest that you should also extend the same representation to the consumer. After you create your industry advisory committee, create a consumer advisory committee. I have no doubt that we can field enough representatives of intelligent, concerned consumers to give you good consumer input. Thank you.

DISCUSSION

Mr. J. Gardner (Dayton, Ohio) : I am a consumer advocate and also the chief of weights and measures. The two speakers who have spoken this morning, the two last speakers, have raised a couple of serious questions that I think need defending here. To us, weights and measures means consumer protection. It seems that there is an inference that the weights and measures officials are another breed of animals that are probably holding hands with the people in industry who make the devices that measure and weigh various items and commodities. If the consumer had not had weights and measures over the last 80 years, we would have been in a whole mess of trouble. Am I getting through to you?

I want to say further that weights and measures holds the least amount of water in most jurisdictions because most political hacks, every time there is an austerity budget or some weights and measures man decides to enforce the law to the letter, cut his budget and step on him.

Furthermore, I do not want to make a soliloquy out of this thing, but I think that the next couple of points I would like to make are extremely important. My people are not in that boat, but some of the weights and measures people that are in this room get less pay than janitors.

Now, I am going to put on my other hat as a consumer advocate. I am a consumer advocate. We do wish to establish regulatory measures. I think what I am saying is that I have amalgamated consumer protection with weights and measures; and without the two being together, we have a divorce situation. Consumer protection in its totality cannot happen.

Weights and measures is the only legal group that is located in every county in the United States. Consumer protection is spotty. Sometimes it is there and sometimes it is not there. I am saying with 80 years of experience, the weights and measures people are the best things consumers have going for them today. Thank you.

Ms. Jonnie Stahl: I live in San Diego and I am nothing more than a consumer, but I find that I am a very important person today. I am glad. I came here to be informed and I have been informed on a number of things very much. I appreciate the speakers for giving me so much information. I am confused on one point, however. I am told that the Weights and Measures Commission is a public servant—a servant of the consumer because it is a public agency, a government agency. I was under the impression that also the VA, the FDA, the Federal Reserve Board, and the California Pharmaceutical Boards were also agencies which were to serve the public, the consumer. Yet, I have been told this morning that the consumer had to sue these agencies. I would like to have this explained to me because I do not understand this relationship.

Mrs. H. Nelson (University of Wisconsin-Extension): My interpretation of the question is, "What is the status of the Conference on Weights and Measures? Is it a public body? Is it a private body?" Is that right?

Ms. Stahl: No.

Mrs. Nelson: I am sorry, then, I don't get you.

Ms. Stahl: My question is if indeed the governmental agencies are servants of the consumer, as was stated earlier, why does the consumer have to sue them, and, of course, as you mentioned, so successfully sue them, if they are supposedly representing us?

Mrs. Nelson: Your point is that government agencies that are supposed to represent us and serve us don't always do it, and consumers get a bit cynical about it. So, more by your deeds than your words would you be judged.

Mr. D. Montanari (Plymouth, Massachusetts): I just wanted to add two remarks to the remarks made by our colleague here. He says we have been in the consumer protection business for 80 years. However, in Plymouth, we have had sealers since, on record, since 1627. That brings us up to 348 years and I still think we are in the consumer protection business. Thank you.

Mr. Sandel: Just one other question now and that is it.

Ms. R. E. Yannatta (Fight Inflation Together) : I am the chairwoman of a consumers group in Los Angeles called Fight Inflation Together. I am also a consumer representative on a State Agricultural Board, so I have some experience in how consumers can represent themselves in government. The question here, I think, is more complicated than anyone has said. I have just a few suggestions.

On the one hand, you defend yourselves as representatives of the public. There is no question in my experience in Los Angeles that the County Bureau of Weights and Measures is by far one of the most active and best consumer oriented departments we have in the State. On the other hand, you say you have to be fair; you have to represent and balance both industry and consumers.

Well, it seems to me that those are not the same position. You are either representing the consumer—clearly have their interests over and above anybody else's—or you are a government arbiter and you have to weigh both industry and consumer. You cannot do both.

I think in reality most government agencies in the kind of government system we have now are arbiters, where they are weighing industry sides and consumer sides. Always, industry's influence is more vocal and more readily present and more accepted than consumers because we are not organized. We cannot afford to come to these conferences for three or four days, etc. That is the reality that consumers are facing. So, even if you, as individuals, want to represent the consumer, you are in this position of being an arbiter and you have to construct advisory committees from consumers just as you construct advisory committees from industry to get that kind of balance.

Lastly, you come to us as consumers and say because you are defending us, you want us to vote more taxes for you to expand your role. Well, then, don't be defensive and tell us that we cannot participate in the decisions you make. The only way that consumers and the public are going to support and expand weights and measures programs is if you allow us to participate, if you explain your programs to us, and if you make them known to us on a much more visual-vocal level than you ever have. Thank you.

Mr. L. D. Draghetti (Agawam, Massachusetts) : I would like to address just a few comments, first of all, to the lady from Chicago. On the scale she was talking about, this Conference is going to address itself to what is known as radio frequency interference. Transmitters can change the readings on electronic devices. We are most concerned about that. We really have no good concrete answers yet, but we are looking into those problems. This is an understanding of the technical side of weights and measures and the approval of these devices. We have the right to reject them any time they are not performing correctly.

Now, you look at unit pricing. Mrs. Nelson, you addressed yourself to unit pricing. Massachusetts was the first State in the Union to support unit price legislation. Last year, the Massachusetts Consumers Council could not enforce the unit pricing law. It is currently under weights and measures supervision in Massachusetts. We are having a job with that thing because, number one, we have again changed our council that makes the rules and regulations pertaining to unit pricing and its enforcement; approval of labels, even down to an explanation of the color of orange that would be on the shelf. This is what we are faced with out there.

SUPERMARKET AUTOMATION—UPC AND THE COMPUTERIZED CHECKOUT COUNTER

by Thomas K. Zaucha, Director of Public Affairs, National Association of Food Chains, Washington, D.C.

With the passage of time, all phases of the food industry continue to appreciate that: (1) the consumer movement is here to stay; (2) the longer it is here, the more sophisticated it becomes; and (3) it is good business to respond to consumer questions and consumer concerns.

Indeed, with the development of the Universal Product Code (UPC) and the automated scanner checkstand, the supermarket industry knows very well that it has a responsibility to respond to consumer concerns about this important technology.

It is understandable that there will be consumer uncertainty when computer equipment is placed in a food store, especially during a period of rising prices. Thus, companies who are experimenting with the new system have set up special consumer panels and have developed consumer dialogues so as to learn those areas where their customers have reservations and questions. It should also be noted that consumer representative Jim Turner has been a very active member of the Public Policy Subcommittee of the UPC Ad Hoc Committee and has communicated consumer concerns about issues such as item price marking as well as proposed research projects that would measure consumer reaction to different aspects of the system. In other words, the industry is sincere in its efforts to respond to consumers' questions and concerns, realizing that more may have been done in this regard at an earlier time.

In that same context, I welcome the opportunity to discuss the status of the UPC system with you and to answer any questions that you might have, because only through an open dialogue can we hope to dispel some of the misconceptions that have arisen, especially in the political arena, as well as build confidence in an innovation that should result in significant benefits to industry and to the supermarket shopper. In short, the industry must develop and maintain the credibility of the system if we hope to achieve any of the benefits.

Ladies and gentlemen, I hope that this morning only symbolizes one in a series of continuing dialogues with weights and measures officials about the implementation and development of the Universal Product Code, because it is our industry's very fervent feeling that it is important that weights and measures officials have a good understanding about the potential impact and effectiveness of the Universal Product Code and the automated checkstand.

On your seats you will find a yellow brochure that contains many of the questions and answers that are being raised about UPC (attachment). When we finish this morning, I would suggest that you make a little side trip next door to see the NCR equipment they are demonstrating. We can talk about it, and explain it, but I think that in many respects the equipment speaks for itself. The NCR people will be pleased to discuss some of the technical aspects of the equipment.

With that background, how many companies are testing the scanner equipment and how are their customers reacting to this change? There are about 50,000 supermarkets in the United States, and the scanner equipment has been installed in only 23 stores:

Marsh Supermarkets, Troy, Ohio
Steinberg's, Ltd., Montreal, Canada
Brockton Public Markets, Stoughton, Massachusetts
Pathmark, South Plainfield, New Jersey
Foodarama, Inc., Middletown, New Jersey
Ralph's Grocery Company, Lakewood, California
Wegmans Food Markets, Inc., Rochester, New York
Foodarama, Inc., East Norriton, Township, Pennsylvania
Piggly Wiggly, Fort Worth, Texas
Dominick's Finer Foods, Inc., Morton Grove, Illinois
Gemco Department Store (Division of Lucky Stores), San Leandro, California
Giant Food Inc., Severna Park, Maryland
First National Stores, Brighton, Massachusetts
Stop & Shop Supermarkets, Boston, Massachusetts
Chatham Super Markets, Centerline, Michigan
The Kroger Company, Indianapolis, Indiana

J. Weingarten, Inc., Houston, Texas
Piggly Wiggly, Fort Worth, Texas
Brodbeck Enterprises, Platteville, Wisconsin
Farmer Jack Market, Rochester, Michigan
Giant Food Inc., Glen Burnie, Maryland
Tri-City Grocers, Belleville, Illinois
J. Weingarten, Inc., Houston, Texas

This is a far cry from the 26,000 figure used by Nicholas von Hoffman in a recent Washington Post article. As you well know, the most volatile issue has been over the question of whether supermarkets should be allowed to experiment with a shelf-marked pricing system as opposed to the traditional method of stamping the price on individual items. But, it is significant to realize that only three of the 23 stores using the scanner are experimenting with the shelf-marked pricing system: the Gemco Department Store in San Leandro, California; a Marsh Supermarket in Troy, Ohio; and a Giant Food store in Severna Park, Maryland. It must be emphasized that the supermarket industry firmly contends that the consumer must be provided with an accurate price description at the point of selection. Thus, in terms of a mutual goal, there really isn't any debate. Everyone agrees that the customer must know that price at the time the product is selected.

I would emphasize further that there have been no policy decisions that would exchange one pricing system for another. Rather, all the supermarket industry has asked for is the opportunity in these early stages of use to test what could be a more efficient and useful system of price identification. For example, what are the economic benefits from a system of shelfmarking? In a trend of skyrocketing operating expenses where labor costs have now increased to 67.28 percent at the retail level, shouldn't this question be explored?

How effectively can consumers use a shelf-marking system compared with the traditional system? Will a new pricing system enhance the use of unit pricing and encourage comparative shopping? Also, what impact will the new descriptive receipt tape (figure 1) have on comparative shopping?

The only way that these important questions can be answered is through a cooperative testing program with consumers. I regretfully submit that any group that chose to follow a political path of promoting mandatory legislation to restrict such experimentation was acting prematurely and not in the interest of the consumer.

Let's turn to that important question of consumer reaction to the three stores which are testing the scanner with shelf marking instead of individual price stamping.

GIANT FOOD INC.

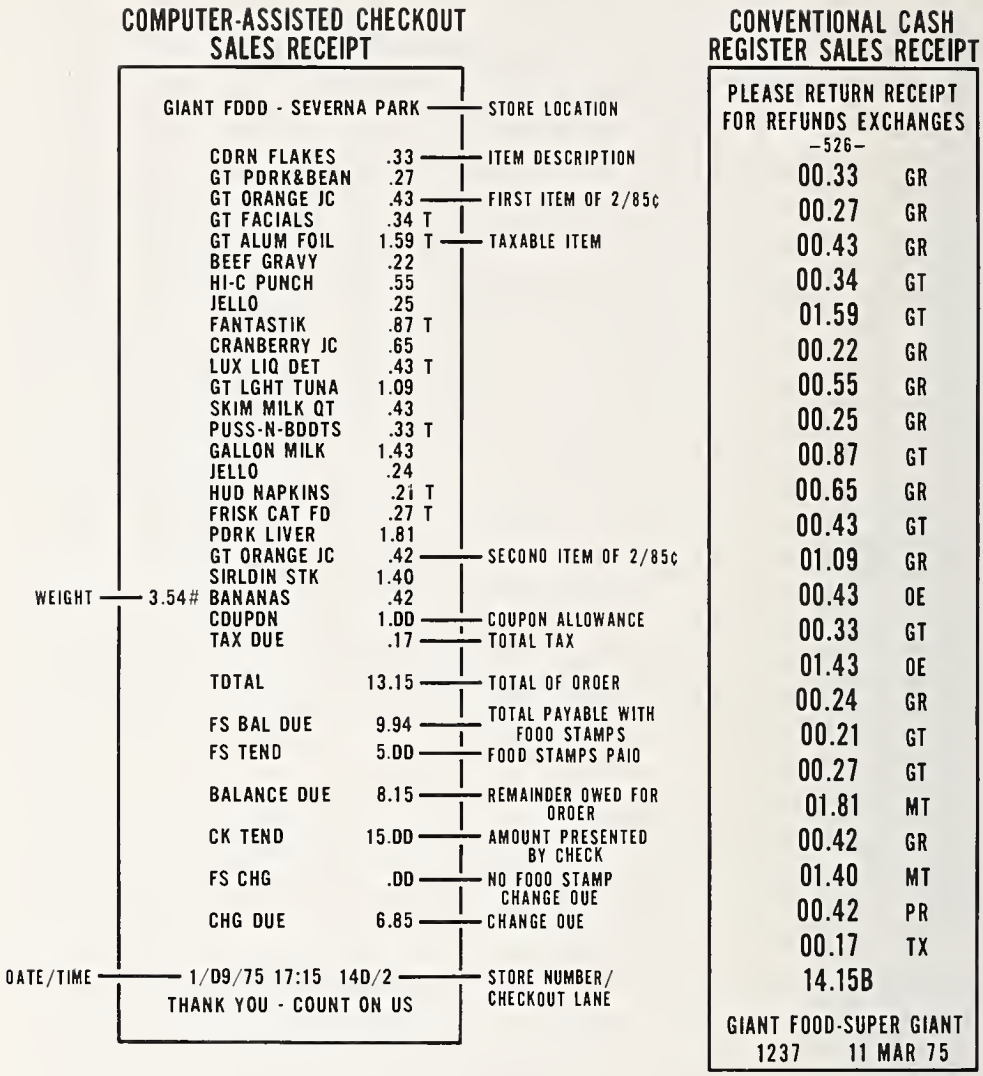


FIGURE 1

Earlier this year the Field Research Corporation conducted a consumer survey of the Gemco store in San Leandro, California, and learned that 51 percent of the customers were not bothered by individual price removal and that shelf labels and the descriptive receipts tapes were acceptable alternatives. Eighteen percent were bothered but would accept the change if it saved them money. Twenty-nine percent were bothered regardless of the savings. Yet, this group continued to shop regularly at the store.

Another study was conducted by Marsh Supermarkets in their Troy, Ohio store. It is interesting to note that from the very beginning Marsh customers were kept fully informed that the equipment would be tested for a period of time with individual price marking and then tested with a shelf-marking system.

Please consider the following consumer reactions. Eighty-three percent felt that the new checkout system was faster than other stores. Eighty-one percent answered that the system is more accurate. On the question, "Are the new price labels easy to read?," 75 percent answered "yes." And, finally, on the price removal issue, 27 percent said that it would be acceptable if there were any savings at all. Thirty-two percent said it would be acceptable with some savings. Sixteen percent would prefer large savings; and 25 percent felt that price marks should be put back.

Giant Food of Maryland is the third food company which is testing the UPC system without item pricing in its Severna Park store. Two important points should be mentioned about the Giant test. First, before the introduction of the scanner, Esther Peterson organized a special consumer committee to resolve questions about the system and to monitor the test being conducted by Giant. Secondly, Giant has opened a second store using the scanner equipment and in this instance has left prices on the individual products. In this way they will be able to measure consumer reaction and use of the UPC system in a store using shelf-price identification compared to the store using item pricing.

I think you will be interested in one study that was conducted by the District of Columbia Office of Consumer Affairs at the Severna Park store in preparation for a hearing on a proposed item-pricing ordinance.

Meredith Fernstrom, director of Consumer Education, testified that a number of significant conclusions can be drawn from the survey findings.

"1. Shoppers in the Severna Park Giant store are generally quite satisfied with the electronic checkout system, citing virtually no complaints about it.

2. The majority of shoppers are not bothered by the absence of price marking, and over three-fourths of the shoppers are opposed to a law requiring price marking on individual items.

3. A majority of shoppers feel that their awareness of price changes has not been affected by the absence of price marks in this system.

4. The system of posting prices on shelf labels is working successfully in the Severna Park Giant, with the majority of respondents finding the labels easy to read and in the correct locations.

5. Shoppers would clearly prefer the savings inherent in a nonprice marking system as opposed to price marking, if such savings are passed on in the form of stabilized prices."

Overall, these early survey results suggest that consumers are pleased with the speed and accuracy of the UPC scanner system. They also are impressed with the itemized receipt tape that will inform them of the specific product as well as the price.

The survey results would suggest that the item price/shelf price issue is an open one that should, and probably will, be settled by the consumer in the marketplace rather than by some legislative mandate. The results certainly are not representative of the absolute position taken by some labor-backed organizations who have opted for government regulation rather than consumer research.

Much more needs to be learned about the total system and the alternative pricing systems before any final policy judgments are made. For example, Dr. John Allen, professor, Food Systems Economics and Management, Michigan State University; Dr. Gilbert Harrell, professor, Marketing and Transportation Administration, Michigan State University; and Dr. Michael D. Hutt, professor of Marketing, University of Vermont, are currently conducting a comprehensive behavior study in UPC scanner stores using the traditional pricing system compared with a shelf-marking system. The research, which is being conducted in three phases, will study the consumers' price determination, unit price determination, price consciousness in the store, price comparisons in the store, unit price usage, shopping time, ability to follow prices and price changes over time, satisfaction/dissatisfaction with store, and store choice. The project is being sponsored by the Public Policy Subcommittee, and the formulation of the project has had direct consumer input. The result will be made available to the public.

In response to the proposed research, the Consumer Federation of America charged that it was a ploy by industry to slow down mandatory legislation. Our position is clear that legislation in this area is premature and not in the interest of the consumer. But, I would sincerely hope that such labor-backed organizations would become more interested in the questions of improved price awareness, improved comparative shopping, and reduced operating expenses, rather than devoting their attention to lobbying for legislation in states like Arkansas where there isn't even a store that has installed a scanner checkstand nor to the best of my knowledge even plans to do so in the foreseeable future.

In conclusion, I hope that I have been helpful in answering some of the questions that you might have concerning the status of the development of the Universal Product Code and the scanner check-

stand. Indeed, there are many important questions that must be researched and clarified. As I indicated at the outset, the credibility of the system must be developed and maintained if it is going to provide benefit. It is in the spirit of creating a greater understanding about the interrelated needs of the consumer, labor, and the supermarket industry that we are most anxious to continue a constructive dialogue about the Universal Produce Code and the electronic checkstand system.

Attachment

UNIVERSAL PRODUCT CODE AND THE COMPUTER ASSISTED CHECKOUT SYSTEM

Government, media, the public, consumer groups and the food industry are following development of new supermarket computer assisted checkout systems closely.

The following Q and A describes typical systems and discusses key issues associated with them.

COMPUTER ASSISTED CHECKOUT SYSTEMS IN FOOD STORES

What Are They?

Basically, applications of commonplace electronic technology, which replace many manual functions at the checkout counter with electronically assisted ones. There is nothing exotic about equipment designed for these systems.

But How Does it Work?

A computer assisted checkout operation is a faster, more accurate system of processing and totaling a customer's order at the checkout counter.

With an electronic system the checkout clerk does not read the prices of most individual items and punch them up on the cash register, as in conventional checkouts.

Instead, the checker passes each computer coded item over an optical scanner built into the checkstand which reports the price of the item automatically to the cash register. The register then prints out a description of the item and its price on the customer's sales receipt.

What About the Code?

The code which uniquely identifies each item on which it appears is called the Universal Product Code (UPC).

It is a coding system that will be used throughout the country by most manufacturers to identify each of its products individually.

It now appears, on about 60 percent of all grocery items in supermarkets, as a symbol with thin and bold vertical lines with ten human readable numerals at the bottom. A sample code symbol is attached. (figure 1).

The first set of five numbers identifies the manufacturer and the second set of five the contents and size of the container.

Is the Price in the Code?

No, the UPC does not show the price. The retailer sets the price, feeds it into the in-store computer, and assures its accuracy through rigid control procedures.

Why Are These New Systems Being Tested?

Essentially, supermarkets have not changed since introduction of self-service in the late 40's and early 50's.

What customers may then have lost in the way of personal services they gained through lower food prices and greater variety made possible through economies of scale inherent in the self-service style of operation.

It is imperative that supermarkets find ways to operate more efficiently as food distributors. If they cannot increase productivity in their operations they will be unable to control rapidly escalating operation costs—which represent on average 22 cents of each dollar of sales—and thus help stabilize food prices.

Sixty-six percent of all operating costs are labor costs. New technology provides the potential for much greater efficiency as well as improvements in service to the customer.

Where Are Computer Assisted Checkouts Now Being Tested

Today there are only 17 stores of the 200,000 food stores in the U.S. using the system.

What Are Potential Benefits for Consumers?

The key word is potential. Food chain managements are not certain about all elements of the system. That is why the industry and the public are searching for answers through pilot testing. Specific benefits are listed further on in this report.

Do Food Chains Consult Consumers in Their Tests?

Inevitably. Each supermarket chain activity seeks advice and comment from customers or consumer groups per se before opening an installation and while the test is underway. One goal of these exchanges is to design the checkout operation according to consumer preference, whenever possible, from the beginning.

The other is to develop competitive advantage through progressively improved systems.

What Is the Biggest Hangup in Consumer Acceptance of Electronic Checkouts?

By far the hottest issue is removal of price marking from individual items.

How Will the Customer Know the Price of Merchandise if Each Item Is Not Marked?

With computer assisted checkout the customer will be provided with multiple price tracking.

1. Item prices and in many stores unit prices will be clearly and prominently displayed on store shelves. One aim of present testing is to develop an ideal shelf marking system. For example, shelf stickers have now been developed that use vivid type size. These new price labels are adhesive backed and designed to stay securely in place on the shelf.
2. A TV-like screen at the checkout counter will flash the identity of the item and its price as it is passed by the checker over the scanner.
3. An audited receipt will describe each item and show its price, in a vastly more complete way than with present sales receipts which identify only the department from which the item is selected and its price.
4. Many pilot stores in addition will provide a dummy checkout scanner for customers to check prices on their own.

What Is the Effect of Proposed Legislation To Prohibit Removal of Price Marking From Individual Items?

Any legislation which aborts experimentation with innovation inhibits full development of a concept.

The industry does not have all the answers to questions about its own needs or the consumer's. It serves no one to handcuff development of the system in its infant stages. Of the seventeen stores in operation, only three are experimenting without item prices.

If legislation proves necessary it may be introduced any time patterns of operation which require legislation modification emerge.

It is in the interest of all concerned for government to study the progress of this new technology. as it is doing now. But legislation now amounts to nothing more than a roadblock in the path of progress toward efficiency and shared benefits.

How Does the Public Benefit?

One regional chain on the east coast equipped with an electronic system foresees a potential savings in operating costs of between $7,000 and $10,000 per month per store. Underscore potential. It is not yet a demonstrated fact. Because of competitive pressure, at

least part of these savings will be passed along to the customer if they materialize as projected.

Other benefits include:

- speedier checkout
- greatly reduced over- and underrings and other human errors. In the earliest test of the system, there were no misreads in over seven million transactions.
- a detailed, audited record of food purchases, which can be made permanent by filing at home
- faster, more thorough product recalls when necessary
- more efficient storage and warehousing of products, thus, operating cost savings which can be passed to the customer and which are not perceived by the general public.

Will Employees Lose Jobs?

Not necessarily. Many union contracts have guarantees against job loss due to automation.

The electronic front end is intended to make more efficient use of labor and open the way to greater capital investment in an industry which is more labor intensive than any other major American industry. Thus, today, its customers in effect subsidize inefficiency.

Proposed legislation would further delay or cripple management efforts to use manpower more effectively. Does it make sense to employ these tactics at this time?

Where New Checkout Systems Are in Operation, What Does the Public Think About Them?

In California, the Field Research Corporation has conducted consumer reaction studies of the Gemco store operation.

Generally the Field Research reveals that respondents overwhelmingly show positive reaction to the Gemco test, with respondents volunteering they like new receipt tapes, faster checkouts and improved accuracy.

To specific questions concerning price markings, the following results were recorded:

1. Fifty-one percent were not bothered by removal of individual price markings and found shelf labels and new receipts an acceptable alternative.

2. Eighteen percent of those surveyed indicated they were "bothered" by lack of price markings, but would accept the alternatives if they saved them money.

3. Twenty-nine percent were "bothered" and desired price marking regardless of potential savings. Yet even this category of respondents continues to shop in Gemco regularly.

The following memorandum is from the Council on Wage and Price Stability of the Executive Office of the President, 726 Jackson Place, NW., Washington, D.C. 20506. It is dated May 7, 1975.

MEMORANDUM FOR CORRESPONDENTS: For information call: (202) 456-6757

Following is the text of a telegram Albert Rees, Director of the Council on Wage and Price Stability, sent to Representative Norman A. Murdock of the Ohio legislature in response to his request for a Council opinion on a bill which would compel prices to appear on grocery store items:

> We are informed that H. 720, a bill to require prices in arabic numbers to be marked on merchandise displayed for sale, is being considered by the Ohio legislature. Such bills would deprive consumers of much of the considerable savings to be achieved through automated checkstands. Such systems should be given a complete and fair test to ascertain whether or not adequate price information can be given consumers through shelf labels and itemized receipts. H. 720 would prevent testing and therefore, we urge that it be defeated.

The following newspaper article is from the Washington Star-News, April 2, 1975.

RAYMOND PRICE

A False Consumer Issue

Like environmentalism, consumerism is a good cause that attracts zealots and "antis," and as a result is constantly threatened by its own excesses.

Take the matter of supermarket pricing.

"Unit pricing," which consumerists pushed, was a major advance for the consumer. With all the various-sized containers, it's a big help to see the price on the shelf in terms not only of total price, but also of how this translates into standard units—so the shopper can see that the 7½ ounce jar of one brand at 93 cents costs 12.4 cents an ounce, while the 9-ounce jar of another brand at $1.02 costs 11.3 cents an ounce. This is progress.

But now there's another and more important advance being pioneered by the supermarket industry which has some consumerists fluttering in anticipatory opposition: the computer checkout.

The way the computer checkout works is this:

Packages are coded by the manufacturer with marks that can be read by a laser scanner. These funny-looking lines tell the scanner the brand, the size, and what it is. Prices are not stamped on the items themselves, but are posted on the shelves—just as they are now. At the checkout counter, the clerk passes each item by the scanner, which in a fraction of a second reads the coded information, and prints both the description and the price on the checkout slip. The customer thus gets a fully itemized sales slip, not just a column of numbers.

It's far faster, saving time for the customer and saving labor costs for the store, which means lower prices. It eliminates checkout errors. And, because the information the scanner prints on the sales slip can at the same time be fed autotmatically into a computerized inventory-control system, enormous additional savings are possible in the store's operating costs—savings which, in a competitive industry, will be passed on to the customer.

This is a remarkable bit of progress for the consumer, where the consumer needs it most.

Yet scare stories have been circulating, suggesting that shoppers would have to shop blind, without knowing the price of each item until they got to the checkout—which is nonsense; all they have to do is read it on the shelf, where most do anyway (and where the unit-pricing information is). Scare stories have also been circulating suggesting that the system would make it easier for stores to hoodwink the customer by manipulating price changes, which also is nonsense. By providing an itemized checkout list, it would make it harder.

Besides, since supermarkets, more than almost any other retail business, depend on repeat customers, the big loser in any sustained effort to hoodwink the customer would be the store, and every store manager knows it.

Nevertheless, in the sacred name of consumerism, legislation has been introduced in Congress (and also in some state legislatures) to "protect" the public by requiring that the price be individually stamped on each item. This wouldn't completely undermine the new system. Most of the benefits would still accrue, including the faster checkout and the more efficient inventory control. But it would be a costly redundancy, requiring the expenditures of an enormous amount of time and labor.

It's understandable that employee unions would push such legislation as a form of featherbedding. But consumerists should know better. They should know that they're going to have to pay for it, just as they do for every other meddlesome interposition between buyer and seller imposed in their name, and ultimately at their expense.

The following transcript is from the Eyewitness News program of the WTOP Television network, Tuesday, April 29, 1975, 6:00 p.m. EDT.

SHOPPERS LIKE SEVERNA PARK COMPUTER CHECKOUT SYSTEM

Max Robinson: The computer age has come to the supermarket checkout counter. Giant Foods' experiment with computer checkout requires some changes in shopping habits, and some consumer groups question whether it really is an advance. Eyewitness News correspondent Patrick McGrath looks into that dispute. (Film Clip)

Patrick McGrath: What makes Giant Foods' new Severna Park store different from your average supermarket is that there are no prices on each individual item of merchandise. Each product does have a funny symbol on it. It's called the universal product code. Although you and I can't make any sense out of this symbol, there is a computer in this store that can.

When the checkout lady passes this can over a laser scanner that's right here in the checkout counter, the scanner sends an impulse to the computer; the computer then rings up the price and a description of the product on a fancy cash register. (Clicking of computer)

Some consumer groups object to the fact that a price is not marked on each item. They charge that the shopper will lose price consciousness and therefore pay higher prices in the long run.

Giant says that the prices are clearly marked on the shelves below every item. We decided to ask shoppers.

How do you feel about this computer checkout?

Shopper: I like it. I think it's fast. I like the whole system.

McGrath: Does it bother you there are no prices on each item?

Shopper: No, not at all. If I want to keep a record, I take a list with me, write them down as I go along, and I have them.

Shopper No. 2: No, I think it's fine. I think it saves a lot of time. I think it's more accurate.

Shopper No. 3: . . . first time I ever tried it. I think it's pretty good.

McGrath: Does it bother you that each item is not individually priced?

Shopper No. 4: No, it don't bother me.

Shopper No. 5: Oh, I think it's real good. It goes so fast, and everything.

McGrath: Does it bother you that each item is not individually priced?

Shopper No. 5: No, I don't think so.

Shopper No. 6: I believe I'd rather have it all marked. When I look at something, I'm not quite sure what price I'm looking at. I check the unit price, but I don't know exactly what the full amount's going to be. It confuses me.

Shopper No. 7: If anybody has any hang-ups about the prices not being on the items, just take a black magic marker and mark it on there when you buy it. You know (phrase unclear). I think it's great.

Shopper No. 8: I don't know if it's a boon to shoppers. It's a lot of fun.

McGrath: They do not have each item marked. Does that bother you?

Shopper No. 9: What do you mean, they don't—?

McGrath: Well, there are no prices on the individual products. Were you aware of that?

Shopper No. 9: But you've got a print-out that gives you even the name of the thing that you bought. See, I bought some sausage and some ham, and it says right on there—even gives you the brand name. (Laughs)

McGrath: That's after the fact, though.

Shopper No. 9: After the fact? Well, if you're too stupid to look at the price on the shelf, why—(Laughs)—you're not paying attention to what you're doing. Right? Right!

McGrath: Well, judging from our non-scientific sample, it appears that computer checkout is a big hit with the shoppers here; and if Giaut finds that it results in significantly reduced operating costs, then it is likely that computer checkout will spread not only to the other Giant stores, but to all of the major supermarkets in the Washington area. This is Patrick McGrath, Eyewitness News, Severna Park.

The following newspaper article is from the Los Angeles Times, Friday Morning, May 30, 1975.

LET THE BUYER DECIDE

That smudged and nondescript "78c" marking stamped on a can of tuna has become the center of a new legislative controversy. The debate is growing as supermarkets begin experimenting with cost-saving computerized checkout systems that don't require the price stamp.

The grocers want continued freedom to dispense with the markings on each item if they see fit, and if their customers continue to find improved shelf markings an acceptable substitute. The Retail Clerks Union and several consumerist groups object, calling the absence of price stamps, on each can and box, a "rip-off." They are pressing hard for new laws to require the markings on every item.

The objections are premature and, so far, unjustified by the facts. The legislation would be a costly way of prohibiting a fraud that doesn't exist.

A grand total of 16 stores throughout the nation, two of them in California, have converted to electronic checkout systems. Some of them still stamp prices on every item. Others rely only on shelf markings.

Customers like the system; sales have been growing faster at the computerized stores than at others.

Stores like it, too. They expect it to save huge amounts of money when each company learns how to use it most efficiently. That means less inflation, which is obviously good news to the customer.

But the law being proposed would wipe out much of the room for savings.

The key to the system is the striped code that now is part of most products' labels. The code identifies the maker and the product—not the price, which varies from store to store and from day to day. When a shopper takes his or her basket to the checkstand, a clerk pulls each item's code label past a scanner. The stripes tell a computer what is inside the package; the computer looks up the price in a file, and the machine at the checkstand prints the entry on the customer's tape.

Errors are far fewer. So are consumer problems in deciphering their purchase records. Instead of a cash register tape that describes each item only as "GROC" or "PROD" the shopper gets a detailed statement of what he bought—"lime jello" or "macaroni" or "sweet peas"—and the price of each. Each store's system costs about $100,000, and can save roughly $30,000 a year in labor costs alone. That includes some checkstand clerks who will no longer be needed because customers can be served faster. It also includes the extra stock clerks now needed to stamp a price on each item.

No one need be fired, for supermarkets already have a tremendous annual turnover of employes.

Foes of the plan to stop stamping each item fear confusion or deception. Shelf markings always seem to be lost, mistaken or in the wrong place, they rightly point out. But the computerized markets have begun using new stickers that should solve those problems. And they say they are getting good consumer acceptance and few complaints.

What's more, state laws already contain penalties for false shelf pricing. That should keep retailers from posting one price and charging another.

There is plenty of competition in the supermarket business. If consumers decide they don't like the priceless packages, they will favor markets that stamp their wares. And if abuses do crop up, as some surely will, they can be dealt with promptly by regulators and legislators.

In the meantime, let's not use needless laws to stifle an innovation that could save added costs for every family. Let the buyer decide.

The following newspaper article is from the Chicago Tribune, Sunday, June 8, 1975.

HOW NOT TO REDUCE PRICES

There is an evangelism about the consumer movement that compels professional consumerists to drive ahead with their anointed programs no matter what they may do for (or to) the consumer. This is the best explanation we can think of for the retail pricing bill which has come before the City Council with the clear blessing of Mayor Daley.

The next best explanation is that it is being pushed by the union that stands to gain the most from it.

As the bill stands now, as drawn up by Jane Byrne, Mr. Daley's resident consumerist, it would increase the retailer's cost of doing business, restrict his ability to offer items "on sale" at reduced prices, and deny housewives the lower prices [mainly on food] that come with advanced technology.

It would do all this mainly by making it unlawful to sell any prepackaged commodity unless the selling price is "marked directly on the package."

Most items are already marked individually. The ordinance means that prices would also have to be stamped on popular, fast-moving items which at present are not normally marked individually—such as candy, packets of soft-drink mix, and ice cream.

The ordinance means that stores would have to continue stamping the price on each container even if they switch to the new, computerized checkout system. Under this system, cans and packages are premarked with code symbols identifying what they are. At the checkout counter, an electric eye scans the code; the price is supplied by a computer; a tape is printed; and the job is done in a fraction of the time it takes at a conventional checkout line. This is a costly system but should save money for both the retailer and the consumer—or at least it should if clerks don't have to go around stamping the price on each container anyway.

The ordinance requires that prices also be given on shelf signs, which certainly should be done and is generally done already, but it requires that this price be given per unit [normally per pound] and that if the item is placed on sale at a reduced price, this figure, too, be changed. This will result in a lot of decimal points and fractions which may mean something to the mathematician, but will be ignored by the average housewife.

The ordinance further requires that if an item is offered "on sale," the "immediately preceding price" must have been in effect for at least 30 days. The effect would be to rule out sales on recently acquired items.

Significantly, the chief supporters of the bill [aside from consumerists] are not the housewives, but rather the Illinois Retail Clerks Association, whose members are paid for doing the stamping and whose wages, of course, add to the price the consumer pays.

There are, of course, some conveniences in having each package individually priced, but one of the truisms of progress is that it means exchanging the lesser advantages of the old for the greater advantages of the new. To require individual package pricing when it is no longer needed at the checkout counter [and when the price is already displayed on the shelf] is like requiring automobiles to be tied to a hitching post when parked or prohibiting them from going faster than the speed of a gallop.

Of course there are some merchants who deceive the public with "on sale" signs. They should be restrained, but in a reasonable manner. Mrs. Byrne would burn down the house in order to cook the pig.

If the aldermen can't see the folly of this, we hope their wives will get to them before they approve a measure which will do more to hurt shoppers than to help them.

DISCUSSION

Ms. Shirley Goldinger (Consumer Federation of California): I want to tell you that in over ten years that I have been working on consumer issues, no issue has so incensed the public and gotten them to feel an alliance with each other as this thing of removing the prices on packages of food. In interviewing thousands of people, I have maybe found one or two persons. I question any surveys you had and would like to know the nature of the sample and how the statistics have been manipulated because I have stopped outside of supermarkets, I have gone to Ralph's Lakewood Store, I have done shopping, I have spoken to thousands of senior citizens who are frightened. They feel we cannot read the tapes without some kind of a magnifying glass. There, in no sense, do I get even the slightest indication that people are for this.

The other thing I ask you is, you have been developing this in your industry for years—where was all the consumer input in the years that this was being developed? Where did you ask consumer groups to sit in on all of these kinds of discussions on these things? We have been asking you for years for pull dating and open dating

procedures on packages. We did not get that. We are going to get this automated computer checkout system instead.

And, finally, we are working with legislatures all across the country to see if we can stop this. Our opponents are the lobbyists that are sent out for the retail food chains.

Last, but not least, I saw the thank you up on the film there. I want to know if you are putting thank you on machines, when you are going to do away with people?

Mr. T. K. Zaucha (National Association of Food Chains): No, we are not going to do away with people

It is very interesting, this food surveillance legislation that is pending in Washington in front of the Senate, Commerce, and Labor and Public Welfare that includes open dating with pull date information. Obviously, your national organization must not have kept you pretty well informed as to the status of that legislation and the intent of it and the support that it is getting, in that the National Association of Food Chains will, in all likelihood, be supporting food surveillance with open dating in it. That is number one.

Secondly, we are not really in disagreement; we are really not. You said you talked to tens of thousands of people and they are very scared about item pricing being removed. I told you right at the outset they are scared of computers, they are scared of higher prices, and there is a credibility problem that has existed for some years about supermarkets. So, there is no disagreement there.

Then, to suggest the removal of item pricing at a time of increasing prices—yes, you are going to get a very adverse reaction. And what was my point? My point was this: We want you then, the consumer, to decide that particular issue. We do not want to go the route of the state legislatures. And if, in fact, you do have the sufficient pressure in particular areas, as you have already asserted yourselves, then you will not have any change.

But, we are suggesting that we want to research, we want to test. Three stores do not make a policy at all. So, I do not really think we are in that much disagreement.

A final point on the Field Research Corporation, how these figures were manipulated. I guess if I pay for the study, I manipulate it. If the government pays for the study, it manipulates it; and if you, as a consumer group—maybe funded by some union who happens to be in favor of it—I guess you manipulate it. The point is this: Field Research Corporation is an independent organization; it has tremendous credibility in California, so go review it. If you find anything wrong with it, publicize it.

Mr. J. Cecconi (NBS): How are prices on items changed in the computer?

Mr. Zaucha: How and when are prices changed? That is a good question. The identification of product, manufacturer, and the specific product is in the code. The price is not in the code. The pricing system is programmed back at the central computer; and, indeed, there is tremendous need to establish the security system and the credibility of changing prices in some coordinated fashion back at the central computer— back at the central office—so that if you have taken off individual item prices, for example, or even if you have not, that you are able to coordinate that with your shelf marking.

I think what you will find in response to that is very clear, precise statements by companies that no such charges will ever take place during the time that the store is in business operation, but it will be done when the store or stores are closed.

Mr. Cecconi: I asked that question for the reason that since there are no prices marked on the cans, you really never can tell. . . .

Mr. Zaucha: Wait a minute. Let us not make that assumption. We have seventeen companies that are experimenting. Fourteen still have prices on individual items. Okay?

Mr. Cecconi: Okay, but you still have three.

Mr. Zaucha: And you have the three that are experimenting.

Mr. Cecconi: Okay, one other item here. On these statistics, when you say it is faster to go through an automated store, you never did mention if there was increase in the number of lanes and an increase in the manned lanes on the average.

Mr. Zaucha: Lanes meaning checkout lanes or aisles in the store?

Mr. Cecconi: Checkout lanes.

Mr. Zaucha: No. The type of study that makes the 50 percent comparison is to take the type of operation that you have now, let us say an eight or ten checkout system using traditional cash registers, and then using a new system with eight or ten computerized scanning devices. That is where the comparison is being made.

Mr. Cecconi: And the man hours are also not changed on the checkout lanes?

Mr. Zaucha: No, I can say that you probably will have a more efficient use of labor. You probably have a more efficient scheduling of labor so it could impact to some degree numbers of hours by checkers.

Mr. D. Franklin (California Public Interest Research Group): One of our services for consumers is retail supermarket surveys. On the last survey we made a couple of months ago, I, myself, surveyed a Gemco Store in San Diego County. There were 90 items on our survey. I compared the shelf items with the item pricing for those 90 items. None of those items were different between the shelf price and the item price. I would like to ask you, firstly, how do you expect a consumer without a computer or without a computer mind to

remember the prices on their average shopping when they get to the checkout counter and be able to determine whether or not, first of all, the shelf price is correct and be able to determine, secondly, whether or not the price of the item that is in the computer happens to be correct?

Mr. Zaucha: Okay. First of all, I would say that your survey about the accuracy of shelf marking is quite an improvement over the GAO study, so share with me at least the point that indeed the supermarkets are attempting to improve on their shelf marking capability.

Secondly, that comes down to the essence of it. You have got to be accurate with your shelf marking if you are going to remove item pricing. If you do not, you are going to lose your customers. If you lose your customers, you defeat your purpose.

Mr. Franklin: You are not going to lose your customers because your customers are not even going to know. That is what we are trying to say. The customer is not going to remember the price of 60 items or 30 items or 10 items when he gets to the checkout counter and know that he has been mischarged. Most people do not go home, take out a pencil, and compare the items that they bought with the items and prices on their checkout list.

Secondly, since you say there are seventeen stores that are experimenting with this and three of them do not have price marking, I do not understand why you have spent most of your talk representing the three that do not and have not given the arguments for the fourteen stores which have kept their prices marked.

Mr. Zaucha: Because the issue at hand is not over the fourteen, it is over the three, so we might as well discuss that in full.

Mr. B. Lame (Santa Cruz County, California): If the industry is concerned with communicating with citizens about possible concerns that may arise in reaction to this system, then I would like my remarks to be received as an attempt at a dialogue with the industry. I just had some thoughts that came to mind during your presentation.

If the retail food industry is two-thirds labor intensive as you indicated, then I do not think the industry should be so surprised that the labor unions would be very reluctant to embrace such a new system.

Mr. Zaucha: There is no surprise.

Mr. Lame: Then, there is an expected negative reaction from the labor unions. I have also conducted a unit price survey in several of the stores in Santa Cruz County; and I also have noted that approximately 20 percent of the unit prices listed on the shelves are complete inaccurate.

Mr. Zaucha: That was a conclusion of the GAO study that I alluded to earlier, suggesting that if you are going to go to a total system of shelf marking, you better improve upon your unit price as well as your shelf total price sticker.

Mr. Lame: Apparently we have requirements now that if the unit prices are listed, they should be accurate; and if 20 percent of them are not accurate, then indeed the requirements are not being met. I wonder what assurance there would be that shelf prices would be any more accurate than the current unit prices are?

Mr. Zaucha: In response to that, I think the magnitude of the issue—as the lady pointed out before—this has become one of the hottest, most important issues that has come down the pike in quite a long time. It is just kind of encumbent upon companies to respond to that shortcoming if they are going to go to that type of system.

Mr. Lame: Knowing a little bit about how computers work, I know that price changes can be programmed into the computer without any customer knowledge—indeed, additions can be made to the bill without even being printed upon the cash register receipt. I think citizens are probably concerned that the computer will slip something by them without their knowledge.

Mr. Zaucha: As I indicated in my conclusion, there is one message that I want to try to get across. What is number one priority for this industry is to establish, any way it can, the credibility of that industry and of the system; and that is one of the questions. We also can get into the idea of computer piracy. People can misuse all sorts of things, but my request is to let us have an opportunity to test it and share those results with you and, hopefully, in doing so establish the better level of working credibility.

Mr. Lame: If I may, just one more item. If the weights and measures departments around the country are going to be expected to check out these systems and make sure that they are accurate and performing correctly, then I think we are going to have to have a much more vigorous enforcement policy, because weights and measures officials cannot be in all places at all times. Thank you.

Ms. J. Schakowski (Chicago Consumer Coalition): I had the pleasure last evening of spending some time with Tom. We met some friends of his, and the issue of item pricing was presented to these two people, who are not involved in this conference, by a member of the Grocery Manufacturers of America and by Tom. Jackie Kendall and I were there and we were kind of silent. As soon as these people heard that prices may come off items, they said that is a really bad idea. It is a very simple thing for us to understand. We have talked to many consumers, all of whom, once they understand the issue involved, agree that prices need to be on.

It seems to us that industry is taking the wrong question. It seems that they are saying, "How far can we go before consumers rebel?," not "What is the right thing to do?"

It seems that you are presenting false choices. We either have the option of clear shelf labeling or prices on. Which are you going to take? You are not going to have both. It seems that is what you are saying to us.

What is the cost of putting the price on? You keep telling us about cost. Do not tell me that you cannot figure quite accurately exactly what it is going to cost the consumer per week, per month, per year, and let us decide whether or not that is worth the price. The consumers that we have talked to feel that they are willing to pay a small amount of money in order to have the accurate information.

It has been documented again and again—the business of inaccurate shelf tags. I bought a large Hershey's chocolate bar the other day. The shelf tag read 8 ounces; the marking on the same item was really 6 ounces. We cannot rely on accurate shelf tags. Again and again through studies this has been shown. We will not have the power of self-enforcement if this information is removed from the label. This is an important tool.

Comparative shopping has been mentioned. I ask you how I in the store can compare the prices of canned corn with frozen corn or fresh corn if I have unmarked items in my cart. There was a cartoon recently in a magazine of two women shopping with a microphone and intercom system, yelling across the isles the prices so that comparisons could be made. This is what it amounts to.

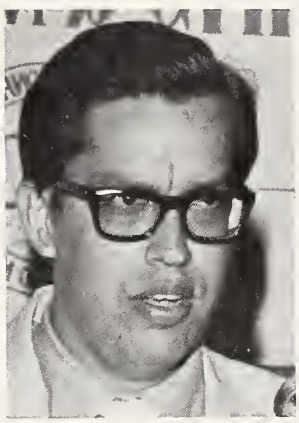
Now, that film was irritating as well. Tom, are you listening? The film was irritating in that the word "pleasant" was used over and over again, that we should have a "pleasant" shopping experience. Who cares? When we walk into that store, we are business people; we are transacting business. We are interested in making the most intelligent, rational decisions we can make. I do not care so much about the music that is piped through or the smile on the checker's face. I want to know that I have been a smart business person and gotten the most for my money. It seems to me that this is impossible without detailed information in the form of item pricing. Thank you.

Mr. Zaucha: Ladies and gentlemen, I just want you to go back through my presentation and the research projects that were being outlined. I want you then to listen to the responses made by the last speaker. And, again, there is no question that there is a concern about the issue—no question whatsoever. Is there a better way of becoming comparative shoppers or not? That is what we are trying to develop.

Now, there is a concern here; and I heard it with some of the inferences made about weights and measures people by consumer activists. We are very anxious in continuing and developing dialogues with consumers. I am very concerned in seeing this political issue that has been developed. Now there is a distinction that is starting to be made between customers and consumer activists, and that should not take place. Industry makes the distinction. All I want you people out there to know is that out in Severna Park, Maryland—the Giant Store—the Troy, Ohio store, and the Gemco Store, you do not find people leaving that store by the thousands that these people have indicated to you this morning; and I hope that does not take place.

MAINTAINING AN ECONOMIC BALANCE DURING INFLATIONARY TIMES

by Kendrick J. Simila, Administrator, Weights and Measures Division, Department of Agriculture, State of Oregon



In providing the Conference executive secretary with a title to attach to my remarks on this morning's program, I could be accused of ambiguity; that is to say the title of this address, "Maintaining an Economic Balance During Inflationary Times," could be taken or interpreted in one or more of several ways. It could suggest a session with helpful hints for household budgeting, a listing of energy-saving guidelines for commercial enterprises, or even perhaps a lecture on fiscal responsibility for public administrators. As worthy as such efforts on the subject might be, however, they would fall short of my purpose here, which is to identify and explain some of the less obvious economic benefits accruing to our troubled economy because of "routine" weights and measures regulatory activities being performed across the country.

By use of the term "routine" in conjunction with weights and measures regulatory activities I do not mean to imply that they are either simple mechanical tasks being performed by individuals with minimum qualifications or that their value to the general public is minimal in comparison to their cost. On the contrary, this routine weights and measures or "legal metrology" activity, properly done, demands the education and skills of qualified measurement standards specialists. Moreover, the value received on an economic scale is minimally at least several times greater than the program costs. What is routine about these activities (device examinations, packaged

products label and content inspections, test purchase or shopping for compliance programs, complaint investigations, etc.) is the quiet, matter-of-fact manner in which they are being accomplished without all the fanfare and headlines of so many latter-day consumer protection programs.

They are also routine in the sense that they have historically been among the first activities of governments anywhere. In Oregon, for example, weights and measures regulation existed prior to statehood as a consequence of actions taken by our territorial legislature. Also while our country is only observing its bicentennial this year, I note (from personal observation on a trip to Florida) that the first recorded weights and measures activity on this continent by immigrants was regulation of the public market in St. Augustine, Florida, some 377 years ago (1598—by order of Governor Mendez de Canzo).

Before proceeding, a few definitions and concepts from the field of economics are in order to be sure we are together on terminology. Someone has said that economics is the science of stating the obvious in terms of the incomprehensible. I am afraid that there is just more than a little truth in that statement. The terms "economics" itself we accept from Webster as being "the science that deals with the production, distribution, and consumption of wealth, and with the various related problems of labor, finance, taxation, etc." Keep in mind from that definition that to assure the equitable transfer of ownership of the many billions of dollars worth annually of products and services being produced, distributed and consumed within this country requires weights and measures regulation.

A person obtains goods or services from another (i.e., transfers ownership) in one of three ways: by theft, by gift, or by equitable trade (which includes sale or purchase). Only with equitable trade through the medium of the market are the needs of both buyers and sellers, users and suppliers, or producers and consumers satisfied. With the major exceptions of financial investments and durable goods (automobiles, appliances, etc.) most all other transactions in the stream of commerce we have called equitable trade involve the determination of quantity in terms of weight, volume, count, or other measure. Without weights and measures regulation of these quantity determinations, they inadvertently or deliberately tend to drift from the category of equitable trade into the domain (at least partially) of theft or gift.

Two terms economists like to use to further subdivide their field of study are: (1) microeconomics—covers those theories and subjects dealing with individual sectors of the economy, specific industries, etc., and (2) macroeconomics—covers those topics and theories dealing with the economy as a whole. The theories and rules that are applicable at one level may not, it seems, apply equally at the

other. Since inflation invariably affects all segments of the economy, we will be examining weights and measures contributions in this battle primarily from the macroeconomic point of view.

To place these macroeconomic benefits in proper perspective, however, we must first touch briefly upon the microeconomic side of benefits from weights and measures regulatory activities. With these then out of the way, the "macro" concepts should stand out more clearly.

The most commonly encountered statistics illustrating the benefits of our work in our cities, counties, and states in the so-called microeconomic category are those we prepare which show the value per capita or per family of effective weights and measures regulation and enforcement in reducing short weight, short fill and other misrepresentations of quantity. At one time a number of years ago the Education Committee of this Conference, I believe it was, projected this value to be $150 per family annually. More recently, in the early 1970's the National Bureau of Standards undertook development of a systematic approach to quantifying these types of microeconomic benefits statistics based on: (1) actual product, service or commodity merchandising methods, (2) inspection results in the jurisdictions, and (3) volumes of trade. While this work has not yet reached fruition, it is the best hope yet that someday weights and measures administrators, consumers, and policy and lawmaking bodies (such as city councils, county commissions, and state legislatures) will be able to quantify and verify the substantial benefits of establishing or expanding effective weights and measures programs.

Essentially what we are talking about categorically then, when we refer to weights and measures regulatory activities directly benefiting the consumers and business in our communities through more accurate determination of the quantity of goods and services, are the microeconomic returns or benefits. These are benefits we can most readily understand and someday hope to place a dollar value on. The prefix "micro" here is itself somewhat a misnomer. It does not mean that the economic returns referred to are small or insignficant, but rather only a partial picture of the total economic sector involved. In fact, the numbers involved in such microeconomic benefits could vary anywhere from the estimated $150 saved annually by one family to the several billion dollars saved annually throughout the United States from the efforts of all jurisdictions in regulating the more than $800 billion in U.S. commerce subject to weights and measures requirements.

The value of the more complex macroeconomic benefits of weights and measures regulatory activities that accrue in response to the economic disorder we call inflation is much more difficult to calculate. (Difficult here is obviously a relative term, since the methodology for

quantifying even the previously mentioned microeconomic category of benefits itself has not yet been perfected.) Nevertheless, these indirect benefits are no less real for their being in the nature of being almost indeterminate. Their one distinguishing characteristic or common denominator is that they are, in a sense, independent of what sector of the economy, or which industry, or type of product or service is being considered. This commonality is shared by the fact that inflation hits all areas of the economy; no area is exempt. The impact of inflation may be felt more in some product or service areas than others, durable goods versus real estate for example, but it cannot be avoided entirely. For this reason the economic pressures for commercial enterprises to minimize inflation-caused reductions in profit margins are widespread and natural in a free enterprise economy.

Let us proceed to examine, then, one of these unique, inflation-fighting so-called macroeconomic category benefits of weights and measures regulatory activity. Consider, if you will, the case of a packaged product seller Company X (be it a producer, distributor, or retailer) whose product raw material supplier has just raised prices. In this oversimplified case we will assume Company X has three choices to avoid bearing the total cost of this inflation it is experiencing. First, it can raise its own product's price a commensurate amount. Second, it can keep its price the same and reduce the quantity per package. Third, it can keep the price and quantity the same but make it faster and with less care, in effect reducing the quality. In actuality many combinations of the above could occur, which possibilities we are discounting in this example.

At this point a further complication needs to be considered and that is the choice Company X has as to whether it will fully or partially disclose or not disclose to the public on its packages the course it has decided to follow. A lack of disclosure in some cases would, of course, be a weights and measures law violation. Decreasing the product quantity but not changing the label declaration would be one such violation. Decreasing the production line overfill, however, would not necessarily result in violations providing that the filling line variables did not then produce a greater incidence of unacceptable lots due to unreasonable individual package errors or minus averages for the lots.

A very probable response of Company X (and particularly if they are selling a consumer product at retail) in this instance would be one that is typical of many other firms that have faced similar choices in the past. That is, a new product package size would be introduced, with full disclosure to the public of the new size and price. The unit price of the "new" item would, of course, be somewhat higher than the old size which would then be discontinued.

At the very least then this new package would require a new round of quantity labeling and fill checking by weights and measures jurisdictions. In some cases a need for checking compliance with unit pricing or exemptions from standard size regulations would also be involved. In any event, the factor of package and/or price change due to inflation would have increased the likelihood of errors over the company's performance during "steady-state" marketing.

The point of the preceding example involving Company X has been to illustrate the types of situations and choices that arise in commercial enterprises as a result of inflationary pressures, that to some degree or other are regulated or kept in check by the presence of a weights and measures regulatory activity. This is not to suggest that inflationary pressures are solely responsible for presenting opportunities for fraud or deception to occur. Obviously, such opportunities exist all along for those who are inclined to operate with such business ethics. What is special about an inflationary period in contributing to quantity measurement and product pricing problems in commerce is the overall climate of change and uncertainty. This transitional environment makes it difficult not only for buyers to make accurate current value comparisons between alternative products or services, but genuinely hard for sellers to fairly value their inventories and price accordingly. The presence of weights and measures jurisdictions on the scene enforcing uniformly those commercial measurement standards and requirements that apply in each case serve double duty during such periods. Not only are the normal economic period (i.e., steady-state) inadvertent or deliberate errors being detected and corrected, but those special case inflation-based problems or errors are also being uncovered, exposed to public scrutiny and given the necessary impetus for correction. I might add that in most instances the necessary corrective action (from our experience in Oregon) is taken voluntarily after the findings have been reported and the appropriate notice given.

A second observation on the inflation-fighting macroeconomic benefits of weights and measures regulatory activities relates to assisting in the maintenance of free competition. Most business failures in our country occur during periods of economic upset. The inflationary spiral we have experienced during the decade of the 1970's to date has been a major economic blow, particularly to many small businesses that are not part of a corporate conglomerate. Without the underlying support of weights and measures regulatory programs that assure each producer, distributor and retailer of products and services that his competitors must meet the same standards in the marketplace, many of the independent and small businesses in all sectors of the economy would not be able to weather the effects of predatory pricing and other cutthroat marketing methods that occur

during periods of dynamic change. While perfect competition does not really exist in a strict sense in the United States, it is approached in many trade channels such as those for marketing agricultural produce. Moreover, it is approximated in the markets for industrial items produced by small firms such as cottonseed oil and rough lumber.

Maintaining a semblance of free competition is obviously a complex economic task. Near monopolies and oligopolies (only a few sellers) in trade occur for a variety of reasons. Some firms are large for the reason that such size carries with it genuine efficiency from the standpoint of production or marketing or both. Others may go beyond the size that is most efficient from a production standpoint in order to gain the market power to influence prices. Still others may want greater size or reduced competition for some noneconomic reason such as prestige (i.e., industry leader). While other regulatory factors are also involved, weights and measures regulatory activities remain leveling mechanisms that assist in keeping competition on an equal footing.

The businessman faced with recurring employee demands for higher wages to "keep up with the cost of living," the retired person trying to meet rising utility costs and higher rent on a fixed income, and the housewife struggling to put food on the family dinner table in a period of escalating food prices need hardly be told that inflation is a serious economic problem. Similarly, the city sanitation worker who is laid off because the municipal budget has to balance; the graduating senior who, despite excellent marks, has no luck in finding a job—any job; and the home builder who finds no market for his product are all too familiar with the evils of recession. Economic ailments affect us all. If allowed to become too severe, they create great physical and psychological hardships and strain the fabric of our country's social and political structure. Moreover, even in mild cases they produce secondary effects, which if untreated feed upon the economy in a self-destructing manner.

While weights and measures regulatory activities, as largely internal domestic government functions, in and by themselves neither stimulate nor retard the basic causes of an economic crisis like inflation, they do play an important role in treating the most visible crisis symptoms: rising prices, shrinking quantities, declining quality, and reduced levels of competition in goods and services. That weights and measures regulatory activities do this has not been readily recognized by either the public or the regulatory agencies themselves. Thus it may seem paradoxical that to better understand what appears perfectly obvious when we discuss our nation's economic picture during the morning coffee break has required description by seemingly complex economic analysis. Personal ex-

perience, however, is often a poor guide to generalization. For example, American motorists may feel inflation has grabbed them by the gas tank when, in fact, the latest rise in the cost of motor fuel they see may have resulted from a government anti-inflationary policy measure (such as an additional oil import tariff to reduce consumption until domestic production and supplies can be increased).

In conclusion, "Maintaining an Economic Balance During Inflationary Times" has meant examining the uniquely important role that weights and measures regulatory activities play especially during periods of the economic disease we know as inflation. This inflation-fighter role of weights and measures activities we see produces benefits that are similar in nature (i.e., economic) to those produced during noninflationary or normal times, yet in a sense they are much wider and more far-reaching benefits to the general public and the business community.

DISCUSSION

Mr. H. E. Sandel (San Bernardino County, California): Thank you very much, Ken. Now, we want to express our appreciation to the speakers on how much we enjoyed their presentations this morning. At this time we would like Mr. Zaucha to come back to the podium, if he would please, and we will start off with questions and stay here as long as you like.

Ms. J. Schakowski (Chicago Consumer Coalition): This has to do with weights and measures enforcement people and the removal of prices in supermarkets. In the Chicago area, two Jewel Stores have already removed prices on many of their items. They do not have a scanning system in, but they do have only shelf prices. Since January of this year the signs for short weight and deceptive practices have gone from $1,550 in January to $8,270 in April. The majority of these signs have increased in the two stores where the prices have been removed, where there are different price markings for similar items on the same shelf, no price markings at all on many packages on shelves. This is the kind of thing that is going to happen. The weights and measures people in many communities are not only charged with the responsibility of weights, but also of consumer protection in terms of deceptive practices.

Mr. T. K. Zaucha (National Association of Food Chains): Obviously the weights and measures people are certainly not holding hands with the supermarkets in Chicago. Secondly, perhaps you could describe to the audience the nature of the Jewel Stores that have taken off prices, why they are taking off prices on certain items, and what is the customer's reaction to that practice in the stores in which they are doing it.

Ms. Schakowski: The stores that are doing it are called grand bazaar stores. They are quite large and the products are placed in large bins with supposedly a shelf price or a marking on the cases, which often is not there.

The response from consumers has been horrible. The Consumer Sales Department in Chicago has gotten over 500 complaints since they started removing prices. In some instances they were forced to put them back on because of the reaction from consumers.

Mr. Zaucha: What is the principle in back of the bin method of storage?

Ms. Schakowski: I assume they think it is more efficient.

Mr. Zaucha: And cost productive, right?

Ms. Schakowski: The prices certainly are not any cheaper. On any of the surveys we have done, the reduction in costs has not been transferred to the consumer. Jewel is the highest priced supermarket in the Chicago area.

Mr. Zauchas: How about those bin prices? Those are not special items? You don't find a couple of pennies off on an item in those bins?

Ms. Schakowski: In connection with other Jewel Stores? They might be cheaper than other Jewel Stores in some cases, but they are not cheaper than other stores in the area that price regularly.

Mr. Zaucha: But, you see, again, that is really the point I am making—that there are some economics that they are . . .

Ms. Schakowski: Sure, but that is two stores. They can afford to lower the prices in those two stores, just like when the supermarkets came along and put all the small ma and pa stores out of business. Let's undersell them until they get out; and then we can raise the price and there's no place else to go. Sure, we have an alternative now.

Mr. Zaucha: You have opened up another area of discussion, but the point is this, the reasoning in back of it is to determine a more efficient, economical way of distributing food; and the grand bazaar concept is certainly unique. It is certainly no indication of the attempt of Jewel or any other market to deceptively keep price information from consumers.

Ms. Schakowski: But it certainly removes the price from the consciousness of the consumer.

Mr. Zaucha: Well, I will disagree with you there. I think shelf marking may, in fact, make people more price conscious. Let me ask you another question. How price conscious are consumers, and is there a need to try to improve on that consciousness?

Ms. Schakowski: Before the prices started flying all over the place, you could approach many women in the supermarket and they would know the price of the products they bought regularly. I

would see it on the shelf, I would see it when it was charged at the checkout, I would see it when I unpacked it at home, I would see it when I put it on the shelf, I would see it when I would take it off the shelf to use it, and believe me, I would remember what that price was.

However, if I am only going to see it on the shelf, I am going to lose consciousness of those prices. I am not going to be aware that I have a jar sitting here from last month that was 39 cents and now it is 45 cents. I just will not be aware of it.

Mr. D. I. Offner (St. Louis, Missouri) : I am a weights and measures official. I cannot ever forget the fact that I am a consumer too. I am not sure which hat I am wearing right now, because I really do not think that there is a dichotomy that actually shows its head a bit in this discussion today. I am not defensive. I do not think we should be defensive, but I think we should keep our eyes open.

Forgetting the weights and measures official aspect now, I, as a consumer, know from my own experience. Long before I was in weights and measures, I did the shopping. I have had a large family. I know what the problem is. The one thing that UPC does—in the direction it is going—is to go against the trend of full disclosure. A consumer is interested in low prices, but I think without doubt the consumer is willing to spend what has to be spent.

The consumer knows that there are a few bargains. You are willing to spend what has to be spent, but you do want full disclosure. I think the trend that we are seeing in devices today is everything is going digital. There is no argument about what the gallonage in the new gasoline pumps is. There is immediate reaction to price; you know what you are spending. But UPC comes along and goes directly contrary to that trend.

The important consideration—and I think this showed its head in the Fair Packaging and Labeling Act, at least the philosophy did —about comparative shopping is being able to make a judgment before you make a decision. Remarks have been made, and we all know they are accurate, regarding the inability to keep shelf-marked prices current. We have seen just an awful lot of this in the past year with rapidly changing prices. We are talking in terms of perhaps reduction of payroll costs on the part of the merchant and so forth, which means, perhaps, lesser ability to keep shelf marking current.

It is like Syd Andrews said the other day in his own presentation, we have always got to be ready to compromise, but we do not have to compromise principles. One of the compromises I think that UPC is ultimately going to have to make is to leave the individual price markings on the package.

Yet, there are many other benefits to UPC. UPC is not a matter of taking price markings off, and I think maybe we are getting things a little out of perspective. As I understand UPC, it seems to me that there are tremendous benefits to the merchant and, perhaps, ultimately to the public. So let us use it, recognizing that we may well have to keep the price on the package.

I know stores in the St. Louis area that are completely universal product coded; not in grocery stores, but in general merchandise stores. In every case that I can think of, they used the UPC and have made no effort to remove the prices. I think the UPC people should be ready to recognize that the public feeling on this is simply going to require that prices stay on the individual containers.

MR. ZAUCHA: I think your point is very well made and taken. I think you hit it extremely well when you talked about the age of disclosure. Ironically, you know, when you talk about the total perspective, universal product code with the detailed checkout tape ideally lends itself more to the age of disclosure. But, as you say, the item pricing issue has really kind of overshadowed all other aspects of it. It may be an issue that a lot of people are going to have to face up to.

MR. OFFNER: I had a lengthy discussion with some of the Toledo Scale Company people last night on this point. I would probably get clobbered by my wife if she knew I were relating this publicly, so this part I suppose is off the record. The fact is I have got a family of seven children—they are largely raised now. From the time I have been married, for a variety of reasons, I have practically lived in grocery stores. Shopping is a time consuming operation. I think anybody here who has ever done any shopping knows that it is not unusual to get into a grocery store and be there for two hours. You have all kinds of decisions to make. Time is an important commodity for all of us.

When I get home, I do not have the time nor the inclination to then recheck a tape. Ideally it may work out all right. You can do this. But, you know you have never bought an automobile and after you have bought the automobile got home and looked at the bill of sale and said, "Hey, this is what I paid for that automobile." It is disclosure, but it is disclosure that is not timely.

MR. ZAUCHA: From that applause, let me ask you a question. Would you then like to see item pricing without the new checkout tape? You don't think that is a consumer value?

Let me again go back to his point that indeed customers in the past, but some still do, would take their list and check it off to see that in fact they had everything. The new checkout tape will offer a new form of audit, but it will take a little time on the part of

customers, just like current checks. It has another advantage to it also. After shopping in Store A, I can take that slip across the street to Store B or Store C and comparatively shop. I can take that whole shopping list and go to a completely new supermarket and do a price comparison on my order. I think that is an advantage in the era of exposure.

Mr. M. Trujillo (Puerto Rico): I have a suggestion that will solve most of the problems that have been discussed this morning regarding UPC. First of all, the price can be printed with a little UPC label in numeral forms. I am sure you are familiar with the fact that there are scanners on the market right now that can read longhand.

Mr. Zaucha: But, the manufacturer does not set the price of the retail item.

Mr. Trujillo: No, no. That would continue to be a function of the supermarket, but instead of pricing at the programming level, he will be pricing at the ticketing level of the supermarket and still have the automated phase of having the machine read the price and include it in the cash register ticket. In that fashion you will have the advantage of the automation that it would involve and you will not have the problem of the regulatory officers and the consumers objecting to not seeing the price. This is entirely possible with the technology now available.

Mr. Zaucha: That is an interesting concept. It really is, and I would be interested in talking to you more about it.

Ms. Schakowski: I would like to take exception to two of your comparison shopping things, and then I am finished. One, there is no way when I get that tape home that I can compare the prices because I don't know what the prices were on the shelf. I cannot remember them. I don't have them on the packages. I cannot check them against the tape so there is no comparison there.

Secondly, I cannot take it to another store and check because I cannot remember whether the cereal was 12 ounces or 16 ounces. There is no way to remember that. It is not written on the tape.

Mr. Zaucha: Oh, come on now! You know the various sizes of cereal . . .

Ms. Schakowski: No, I do not. How many various sizes of cereals and soap detergents are there . . .

Mr. Zaucha: I don't accept what you are saying. I know the type of cereal sizes that I buy . . .

Ms. Schakowski: What are they? How many sizes of Kellog's Corn Flakes are there? Have you ever done a price comparison survey between supermarkets? Have you seen a package of cake mix in one store that might have been 18 ounces and the same brand in another store that was 17¾ ounces?

Mr. Zaucha: The same brand?

Ms. Schakowski: Same brand, same product, same size box, different weights.

Mr. Zaucha: How does that help by having the item priced? You still cannot compare it.

Ms. Schakowski: You cannot compare it. How am I going to compare this tape with another store if they are not the same size?

Mr. Zaucha: Let's conclude on this point. I can assume then that your position is, and this is your official position, that the consumer receipt tape in no way helps comparative shopping between stores?

Ms. Schakowski: Between stores?

Mr. Zaucha: That's right.

Ms. Schakowski: No, not the way it is now, unless it has a size on it.

Mr. Zaucha: Okay. That is interesting. Thank you.

OVERVIEW OF CONSUMER ISSUES

by Charles A. Barrett, Chief Deputy Attorney General, Department of Justice, State of California

It is a pleasure to address this 60th National Conference on Weights and Measures, especially as you are holding your Conference for the first time in California.

I want to talk to you today about a subject which is of concern not only to those of you who are weights and measures enforcement officers, but to all of us who are interested in the future of the consumer protection movement. This subject is the proper relationship between the fifty states and the national government in protecting consumers.

It is important to recall that our Constitution is expressly conditioned upon the delegation of certain enumerated powers to the Federal Government and the reservation of all powers not expressly delegated. This fundamental principle has important applications in the field now called consumer protection just as it has had throughout our history in the area more traditionally described by the phrase "the police power of the states."

The idea behind the phrase "consumer protection" is hardly new; it predates our American Revolution by more than 500 years. The concept that those who purchase goods and services have a right to accurate information concerning those articles has specific expression in the Magna Carta. In 1215 the English noblemen on the fields

of Runneymede required King John to guarantee the English people certain civil and political liberties including commercial rights. Section 35 of this charter of fundamental rights provides:

> "There shall be one measure of wine throughout our whole realm, and one measure of ale and one measure of corn—namely, the London quart—and one width of . . . cloth . . . and with weights, moreover it shall be as with measures."

By the Magna Carta the English monarch was required to recognize that varying standards of measures and, equally important, the giving of false information about the weight or measure of a product is harmful and is not only because of the obvious and immediate injury to the purchaser, but because of the depressing effect which false information inexorably has upon commerce in general.

These provisions of the Magna Carta are the modern basis for the establishment of government-sanctioned weights and measures offices and uniform standards of weights and measures. And they represent the early recognition in our Anglo-American system of jurisprudence of the futility of a system of commerce based upon the short-sighted doctrine of caveat emptor.

The provisions of the Magna Carta, later common law principles developed from the Magna Carta and the enlightened self-interest of merchants, necessarily resulted in increased government regulation of the marketplace for the protection of all concerned.

This governmental regulation has developed over the years to provide protection to all consumers—and this includes businessmen—from unsafe products and from goods which are misrepresented. The object of this regulation has been to increase the information available to consumers so that the choices we make are informed choices.

As we all know, governmental regulation of the marketplace has increased substantially in the past several years. The last ten years have seen the creation of Federal agencies with responsibilities for auto safety, tire safety, consumer product safety and environmental quality, to name just a few. At the same time increased public awareness has brought about demands for more activity on the part of the Federal Government.

Some have recently suggested that there is now too much regulation in the marketplace, that the proliferation of Federal agencies and regulatory bodies has begun to stifle commerce, that there is no need for more Federal agencies to watch out for the interests of consumers. At the same time, certain of the voices which cry out against proliferation of Federal agencies, suggest that the historic role of the states in protecting our citizens from short measure and harmful products ought to be transferred to the Federal Govern-

ment, that only centralized control can protect both commerce and consumers.

There is an apparent conflict in these two proposals—on the one hand we are told we do not need Federal regulatory agnecies and on the other hand, centralized control and enforcement is necessary. Let me suggest that both proposals are wrong; that if we analyze each position in its context we will find that there is need for aggressive Federal consumer policies, as well as continued activity by the states to assure our citizens that the products they purchase are full measure and not deceptively packaged.

Of course there have always been those who contend that government—whether it be Federal or state—should not meddle with the market mechanism, that legislatures should not by statute require truth in packaging, that the courts should not hold manufacturers strictly liable for product defects. What gives these voices a rallying point in 1975 is the legislation now pending in Congress to establish a Consumer Protection Agency (CPA), the opponents of which claim will only superimpose another layer upon the already mammoth Federal bureaucracy.

The chief purpose of the proposed Consumer Protection Agency is to advocate the interests of consumers before Congress, the courts, and, most importantly, before other administrative agencies. The theory behind this legislative proposal is that there is need for Federal intrusion into the marketplace to facilitate rational spending and avoid economic waste; consumers, continue the advocates of the CPA, will never be organized sufficiently to have their demands have sufficient impact in the marketplace; to bring about the balance of forces which consumers need they must have the benefit of government assisted bargaining power.

But what of the complaints that there are already too many Federal regulatory agencies and that the same objectives can be achieved by establishing an Office of Consumer Representative in the present agencies? Many of those who object to the proposed Consumer Protection Agency argue that it would merely add another level to the already overloaded Federal bureaucracy.

Their point may have validity, and it underscores an important dilemma. The reason, it is said, that we need this agency is that the government is so unresponsive and bureaucratic that the consumer is left out. But have we solved his problem by establishing yet another bureaucracy? A lot of people are saying that government has become too big and unresponsive, that more money and more bureacracy is not the answer. There seems to be a general feeling in Washington and the states that we should get away from the 1960's policies of ever-expanding government.

While the question of a Consumer Protection Agency is important, equally important is the reaffirmance of the constitutionally defined

role of the states as separate and distinct entities actively engaged in the protection of their citizens from the consequences of anti-social behavior including such economic crimes as the sale of commodities in short measure.

In the last 40 years we have witnessed a vast increase in the functions performed by the Federal Government. This demonstrably increased role of the Federal Government has resulted in part from the failures of the states to take an aggressive role in resolving critical problems.

In the last 10 years the Congress has enacted the Fair Packaging and Labeling Act, the Wholesome Meat Act, the Poultry and Poultry Products Inspection Act and other laws designed to impose national standards of truth in packaging and wholesomeness in foodstuffs. These objectives are important to the health and welfare of our people and deserving of support. Unfortunately, however, there have been included in many of these otherwise beneficial laws, preemption clauses which have been used by a few short-sighted businessmen and by regulatory agencies insensitive to the needs and concerns of consumers to frustrate the efforts of weights and measures officials in the discharge of the duties which they have performed since the time of the Magna Carta.

While the announced purpose of these preemption clauses is to promote commerce through uniformity in regulatory standards and enforcement procedures, they have in fact had contrary effects. Some packers, seeking short-term gain, have argued that their products need bear true statements of weight only when they leave the packing house door—not when you and I read the labels in the supermarket, and not when other businessmen buy them for resale to us or for further processing. And certain Federal agencies have unthinkingly taken up this position, forsaking the statutory requirements which mandate that they administer the laws for the protection of consumers and competitors.

The adverse economic consequences which follow from acceptance of the "accuracy when packed" concept are severe loss of what lawyers call "the benefit of the bargain," reduction in the true value of the product mislabeled, and loss of confidence in our ability to rely upon weights and measures representations. Further acceptance of this standard of consumer deception would result in consumers and businessmen alike losing confidence in the market system and in the governmental agencies charged by law with protecting and with promoting the interests of consumers.

Of equal importance is the argument advanced by these same short-sighted persons that the various preemption clauses mean that the states no longer have any function in enforcing laws designed to protect their citizens from fraud in the market place, that the Fed-

eral Government has exclusive jurisdiction to enforce these laws. Those who make this argument do so with the knowledge that the Federal agencies which they would have assume the powers of the state in this field do not presently possess the expertise, experience or equipment necessary, let alone the funding necessary, to train the thousands of additional Federal employees who would be needed to make any such Federal program effective.

The practical consequences of this argument are twofold. First, you and your associates would have to close up shop—cease inspecting products merely because at one time they were in a plant subject to some Federal regulation. And second, there would be no Federal inspector to replace you. The advocates of federalization of weights and measures inspection do not include in their proposal a request for Federal funds to replace the state and local weights and measures officials whom they claim are meddling in something that is too important to be left with the states. And as a practical matter, there will be no Federal funds forthcoming to perform this necessary function.

It would seem to me to be a misapplication of Federal monies to train Federal employees to do the job already being done by state and local employees. State and local weights and measures officers are hardly meddling, they are carrying out one of the functions traditionally performed by the state. In fact, we have seen that enforcement through the police power of what are now truth in packaging laws predates the recent Federal legislation by hundreds of years.

Most importantly, to permit centralization of weights and measures enforcement would allow a major encroachment upon the historic and necessary role of the states of protecting our citizens from unsafe, unwholesome and deceptively packaged goods. The states did not surrender their police power when they delegated certain powers to the Federal Government. Although some states may have been less than vigorous in the past in using this power, they still have it available and should not permit further encroachment.

While I advocate vigorous action by the states in weights and measures enforcement and other aspects of our police power, I also believe that there should be a uniform national standard—true weight to the consumer. Only this standard will fulfill the commitment which we all have to assure consumers that they get what they pay for and to protect businessmen by assuring that all must meet the same measure.

There is a legitimate role and purpose for the Federal Government in the weights and measures field. Indeed, an outstanding example is the role of the National Bureau of Standards to assure the integrity of our system of weights and measures—to assure that "a pound is a pound the nation around."

There is also a legitimate role for the states—to protect our citizens—businessmen and consumers—from fraud in the marketplace whether it results from false or deceptive packaging or unwholesome, adulterated or unsafe food or other commodities and regardless of where the commodity was packed.

There is no need for there to be an irreconcilable conflict between Federal and state administrative agencies in the enforcement of truth in packaging laws. All that is necessary is recognition of the historical role and practical necessity of enforcement by the states of standards which protect the public—be they consumers or competitors—from fraud in the marketplace. Indeed to a certain extent this goal is recognized in current Federal legislation. And, to the extent it is not, it should be.

Most importantly, enlightened administration of existing laws by the Federal agencies in the interest of consumers and competitors can go a long way toward recognizing the role of the states in our Federal system.

The argument made by those who would remove the states' police power has important consequences beyond the weights and measures field. In California and other states there are vigorous programs to protect consumers—again this includes both the public and businessmen—from deceptive acts and practices, including deceptive packaging, false advertising, and monopolization and other restraints of trade.

For example, in California in the past 6 months we have filed lawsuits and obtained judgments in several deceptive packaging cases alone. And just three weeks ago we filed a major anti-trust action against most of the major oil producers alleging restraint of trade.

We have also taken steps to alleviate one of the most significant problems of consumers, that of inflation. In October 1974, I appointed an inflation task force to examine ways in which we could attach this most serious problem. In March of this year the task force reported upon specific legislative proposals which, if enacted, would bring about substantial savings to California consumers. These proposals include repeal of laws forbidding price advertising in certain fields and repeal of California's fair trade laws, proposals which are now before our legislature.

My point is this: It is equally important in all areas that the police power of the states not be restricted. The constitutional role of the states does not require that we wait upon the Federal Government to act in each area in which the health or welfare of our citizens demands protection. To the contrary, both our constitutional responsibilities and practical necessity require that the states vigorously exercise our responsibilities to consumers—be they individuals or

businessmen—to insure that the marketplace is truly free by assuring that products which are offered are safe and honestly presented.

Those of you assembled here in San Diego this week should take particular pride in your history and in your present role as bearing an important part of this responsibility. I wish you well in your endeavors to assure honest weights and measures and to carry out the proper role of the states.

DISCUSSION

Unidentified Voice: I would be remiss as a board member of the Consumer Federation of America, and Helen Nelson, if she were here, would be remiss too, if we did not call attention to the fact that in no way is the national consumer movement looking to curtail or restrict the support of the independent consumer agency bill.

We, too, recognize the problem of preemption. We, too, recognize that consumer problems are best handled at local levels. Wherever you can do that, the responsiveness of local government to the complaints or problems of the consumer is the best place for this to be done.

But there is a role for the independent consumer agency in the Federal Government. There are many consumer problems of a national level that the states cannot deal with. For example, there was no consumer input in the Russian wheat deal, which resulted in the 14 percent increase in the price of many food products. That is not something that state consumer protection agencies would be getting into. But it is something where, if there was a consumer independent voice on the Federal level, there would be input on that level from consumers as far as their feelings and the impending Russian wheat deal again.

There are many decisions made on the national level that affect the price of gasoline—millions of dollars that consumers spend for gasoline. Again, although you are involved on the state level, there is a national consumer view on this. An independent consumer agency bill has been formulated and supported for over five years by many of the consumer groups, many of the California congressmen, two United States Senators; there is a valid place and a valid voice for it in the Federal Government. We are aware of state consumer protection problems. We certainly support all of the power that you people have; and we would be willing to give you a lot more. Thank you very much.

Mr. D. McCurry (National Consumers Congress): I have heard this morning two or three things that I think had not been touched on and I feel will not be touched on as we move on; and I want to speak to them. I have sat here all week as a consumer representative

who used to work with the measurement section of USDA and heard folks time after time try to separate the technical aspects of the jobs they have on the state and local levels in weights and measures from the public policy role that those jobs have; and it seems to me that is an impossible kind of thing to do. It, I guess, behooves a conference like this to pat themselves on the back and say in a body what a good job we have done, and you have. But time after time, in talking to individual weights and measures sealers here, I have heard of great frustration—if we had budget, if we had more personnel, if we could keep up with the technological changes that are taking place in the industries that we have to regulate, then we could in fact do a better job.

Those are public policy questions. It gets to my mind, down to the basis at least of what I have heard some of the consumer representatives saying here this morning, that if you want less bureaucracy in government, government is going to have to be opened up so that there is some input from folks who do not have the day-to-day information that an inspector or sealer has. Records have to be opened up when convictions are obtained, then those have to be publicized.

It is strange that as technology increases the so-called choices that the consumers have in the marketplace—and we all know that the quality production and the quality of products on the shelves in the stores give us less and less choices as each year goes on—that as we try to make some sensible choices, that unless consumers can enter into the very process where you gentlemen, and if there are some ladies here who are heads of departments or city sealers, include you as well, have to choose and protect consumers, then the only way that you are going to get real support for your jobs and your budgets is to have consumers enter into that marketplace.

Those are public policy questions and those are questions where you all are not getting the kind of support from consumers, because the support to the consumers is not getting out, that says here is what we are doing for you—the kind of education that says, yes, we have cited this number of stores in the past month for shortweight practices, we obtained this number of convictions. Consumers come down and try to look into the files to see what stores they should be wary of and what stores they should not be wary of. Too often a hassle to find that information is insuperable for consumers to deal with.

AFTERNOON SESSION—WEDNESDAY, JULY 16, 1975

No General Session Was Scheduled

MORNING SESSION—THURSDAY, JULY 17, 1975

(Harlon D. Robinson, *Vice Chairman*, Presiding)

THE PERFECT FORMULA AND PMTD

by Allen J. Farrar, Legal Adviser,
National Bureau of Standards

When I was asked to speak before this Conference, I was especially pleased and proud to do so. From my nearly ten years' association as the Bureau's chief counsel, I have come to respect and admire the accomplishments and contributions of weights and measures officials and those allied with you. In these times when guarding measurement integrity—the theme of this Conference—is so important to insure that equity prevails in the marketplace, I know of no group that has had a greater impact on our society or our economy than the community of weights and measures officials.

It was my intention when I first planned my talk to delay until nearly the end of it the meaning of the letters "PMTD" which are in the title. However, as a lawyer, I began to realize that much of my talk, which is about the laws under which the National Bureau of Standards operates, might not mean as much to you unless I pointed out at the start the importance of the phrase those letters stand for—People Make The Difference. Laws may be enacted, but in the final analysis, it is how the people, through their attitude and approach, carry out and obey them that make the laws a viable, effective and meaningful part of their daily lives. While the law is important, of even greater importance are the people who make the law, those who administer it, and those who operate within it. In short, it is the people who make the difference. And that is what this talk is really all about.

Today, I want to talk to you about a subject that has been on my mind for some time—and I suspect on yours as well. It has been 70 years since the first meeting was held at NBS with a handful of weights and measures officials to look into the matter of the methods of inspection of commercial weights and measures and the working standards used by state, county, and city sealers. Since that time, a number of model laws have been proposed to this National Conference. Many have been adopted and subsequently enacted into law by the state legislatures. Some of these model laws I will mention a little later.

In connection with this overall process, however, the question which somehow continues to elude us is, "What is really the proper role of the National Bureau of Standards in the establishment of standards and regulations?" This basic question spawns a series of related questions. Is our role, or should our role be, that of a leader with all the functions, responsibilities and prerogatives that such a term implies; should we play a cooperative role with state and local officials; perhaps assume a passive position akin to that of a moderator by providing appropriate direction or guidance where needed; or a combination of the above depending upon the facts and circumstances of the particular situation? Finally, whatever our role is or has been, do these strange and difficult times require a reevaluation of our statutory role with a view toward adopting a new stance?

If we are to assess what the Bureau's role in this area should be, let us first examine its primary mission and purpose. While that sounds like a rather straightforward and simple assignment, the fact is that to do so is not an easy task. The National Bureau of Standards is a rather complex and multifaceted organization. It covers a variety of scientific disciplines and engages in a great many activities and programs involving virtually the entire spectrum of physical measurement matters. Essentially, however, the Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. One of the ways it seeks to achieve that goal is to furnish essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry and commerce.

With the Bureau's broad overall goal in mind, let's examine the machinery which powers the Bureau toward that goal—in short, the laws under which NBS operates and carries out its programs. More particularly, since we are primarily interested in weights and measures laws, standards, and regulations, we should focus on that portion of the Bureau's authority which is relevant to our area of interest.

The first—and by far most important—statute is the NBS Organic Act—the Act of March 3, 1901, as amended. Section 2 of that Act sets out six basic functions which the Bureau is authorized to undertake. Of those, I think two are of special interest to us. The first is "the custody, maintenance, and development of the national standards of measurement and [providing the] means and methods for making measurements consistent with those standards, including the comparison of standards used in . . . commerce . . . with the standards adopted or recognize by the Government." The second function—and the one most frequently cited and relied upon by

the Bureau in connection with its interaction with other organizations—is the one which authorizes "cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications." I plan to refer again to that particular function in a moment because it, in my judgment, is central to the theme of what we are considering—the statutory role of the Bureau in the establishment of weights and measures laws, standards and regulations.

The two functions I have mentioned might be termed general or basic functions. To carry out those basic functions, the Bureau is also authorized to undertake a rather lengthy list of 19 specific activities. Here again, two of those specific activities are of particular interest to those concerned with weights and measures. The first of these is authority to undertake "the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment." The second is one that appears in virtually every handbook, model law, report, or other publication issued by the Bureau's Office of Weights and Measures and one, therefore, that I am certain almost everyone in this room knows. That function is "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection."

So much for the Bureau's basic statutory authority. The Organic Act, however, is by no means the only statutory authority under which the National Bureau of Standards operates, nor in which it is named to carry out a specific mission or responsibility. There are a total of 20 Federal statutes that have been enacted over the years which assign specific scientific duties to NBS. As the needs of this Nation grew and the technology advanced, NBS was given additional responsibilities to deal with areas such as energy conservation, environmental pollution, and the advancement of computer technology. Some of the statutes in these areas may not be known to you. Others, however, such as the Fair Packaging and Labeling Act and the Consumer Product Safety Act, I am sure are well known to you.

Having cited the Bureau's Organic Act and indicated that there are a number of other statutes under which the Bureau exercises responsibility, let me now point out something you may not realize. Neither the Organic Act nor any of those other statutes confer on the National Bureau of Standards any regulatory authority or enforcement powers. At one time the Bureau was assigned by various statutes the responsibility to develop and issue mandatory standards covering brake fluids, seat belts, the closure mechanism on refrigerator doors, and wearing apparel. However, even those statutes placed the responsibility for inspection, insuring compliance with the

standards, and prosecution for violations on such regulatory or law enforcement agencies as the Federal Trade Commission and the Department of Justice. In recent years, new laws have been enacted which have added other regulatory agencies, such as the Department of Transportation and the Consumer Product Safety Commission, and clothed them with inspection and enforcement powers to make sure that mandatory standards issued by the Government are complied with.

If the Bureau has no regulatory or enforcement authority, how then does it carry out its authorized mission of developing the national standards of measurement, the establishment of standard practives for incorporation in codes and specifications, and securing uniformity in weights and measures laws and methods of inspection? In a word—cooperation. Cooperation with whom? Cooperation with other governmental agencies, with private organizations, and with the states. How did this type of role for NBS evolve and, more importantly, has it been effective?

Because of the growing interest in the Nation's history as the bicentennial date of its birth approaches, a brief look at the historical background of weights and measures activities in this country will, I think, throw some light on how the Bureau derived its present authority. From there, we can see what results have been achieved through the cooperative approach and whether it has been effective.

The United States Constitution states quite plainly that "the Congress shall have the power . . . to regulate commerce . . . among the several states . . . and . . . to fix the standards of weights and measures." In the nearly 200 years of this great Nation, you will see that the Congress has done very little in the field of weights and measures.

In 1836, the Congress adopted a Joint Resolution which directed the Secretary of the Treasury to supply each state with a copy of weights and measures adopted as standards for the customhouses. In that way it was intended that a uniform standard of weights and measures could be established throughout the United States. This action by the Congress, taken 60 years after the Declaration of Independence, was the first definite action directed toward achieving nationwide uniformity of standards. An Act two years later authorized a gift of balances to the states to carry out the Resolution of 1836.

It may be of interest to note that to carry out those early Congressional directives, the Department of the Treasury established the Office of Weights and Measures to construct and distribute the standards and balances called for under those legislative actions. This Office later became known as the Office of Standard Weights

and Measures. By that name the Office remained until section 1 of the Act of March 3, 1901 decreed that "the Office of Standard Weights and Measures shall be known as the National Bureau of Standards." The Bureau, however, remained as a part of the Treasury Department until 1903 when it was transferred to the newly created Department of Commerce and Labor. The Department of Labor was split off as a separate department in 1913.

Returning now to the chronology of Congressional action, the Congress, on July 28, 1866, legalized the use of the metric system and, by a Joint Resolution passed on the previous day, directed the Secretary of the Treasury to furnish to each state a set of standards of the metric system. In 1881, a complete set of all the weights and measures that had been adopted as standards was ordered by Congress to be delivered to each state.

The Joint Resolutions and laws I have mentioned comprise the total of Congressional directives in the field of standard systems or units of weights and measures. There are no specific Congressional requirements imposing uniformity among the states in the matter of standards. However, the immediate result of the early distribution of standards to the states was, in virtually all cases, the adoption as state standards of the standards received from the Federal Government. Hence, uniformity in this respect was brought about indirectly rather than by direct action. Further, as I am sure almost all of you are aware, the Bureau has undertaken the distribution of a completely new set of standards, precision balances, and laboratory instruments to each of the states. To date a total of 45 states have received their set of standards and instruments to replace the ones made available to the states under the laws of 1836 and 1838.

In addition to the laws I have mentioned, there are two provisions common to current state weights and measures laws which operate to establish a firm basis for national uniformity of state standards. The first of these provisions is to the effect that weights and measures, which are supplied to the states and certified by the National Bureau of Standards, shall also be state standards. The second is to the effect that the state shall submit its primary standards to NBS once every ten years for recertification or shall have participated in the NBS laboratory and standards surveillance program.

As you can see from this brief glimpse into the history of weights and measures legislation in this country, the Congress, except for some relatively minor and little used Standard Barrel Acts of World War I vintage, has not seen fit to exercise, to any substantial degree, its authority under the Constitution to establish weights and measures. Nor has it seen fit to vest that power in any Federal agency. What the Congress has done is make plain its intention that a joint

effort be made between the Federal Government and the states to establish a viable and effective weights and measures system. This approach is manifested in that portion of the NBS Organic Act already cited which permits the Bureau to undertake "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection."

I think we are at the point now where the question can fairly be asked in order to gauge the effectiveness of the cooperation approach assigned to it by the Congress—what results has the Bureau achieved in carrying out that approach? An achievement of major importance is the establishment of the National Conference on Weights and Measures. This prestigious group, which has been functioning since its formation 70 years ago, is the model the Bureau and state officials concerned with other standardization problems have used and relied on to form similar organizations. Perhaps the best example of an organization which has patterned itself after this Conference is the National Conference of States on Building Codes and Standards. Another is the forthcoming National Conference on Radiation Measurement. But rather than dwell on those groups who have seen fit to organize on a basis similar to this Conference, let's reflect on a few accomplishments that have come out of this Conference.

No less than eight model laws, regulations, and ordinances, as well as revisions and amendments to those models, have been adopted by the National Conference over the years and enacted into law by various state and local legislative bodies. Foremost among these has been the Model State Weights and Measures Law which was first adopted by the National Conference in 1906. This was also the first model law to be adopted by the National Conference. Amendments and revisions have been made to this model law over the years to keep it current with new or changing practices and needs. I believe it is correct to say that the weights and measures laws in every state are patterned generally on some version of the model law adopted by the National Conference.

Another significant model adopted by the Conference is the Model State Packaging and Labeling Regulation. This regulation has in turn been adopted by 31 states to date. The Conference first adopted a packaging and labeling regulation in 1952. It was later rewritten to be compatible with the Fair Packaging and Labeling Act enacted in 1966, and the current version of this regulation includes amendments which were adopted by the Conference in 1974.

Other models adopted by the National Conference during the past ten years include the Weighmaster Law; the Registration of Servicemen and Service Agencies Regulation; the Unit Pricing Regulation; the Open Dating Regulation; and the Method of Sale of Commodities Regulation. The Model Weights and Measures Ordinance

is a composite of those laws and regulations. Its purpose is to provide for a comprehensive weights and measures program at the city or county level and thus complement state activity in this area.

There are in addition several handbooks and publications that have been published by NBS for use by state and local weights and measures officials. The most significant of these is Handbook 44 entitled "Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices." This handbook incorporates code requirements that were adopted by the National Conference and, like the model laws and regulations, have been enacted into law by state legislatures. Others, although not adopted by the National Conference, have been recommended by the Conference for use by state and local officials. These include such well known handbooks as Handbook 67 entitled "Checking Prepackaged Commodities;" Handbook 82 entitled "Weights and Measures Administration;" and Handbook 112 entitled "Examination Procedure Outlines for Commercial Weighing and Measuring Devices."

The "cooperative" approach found in the NBS Organic Act is certainly the hallmark that typifies the nature of its activities. It has resulted in the productive interaction of NBS with the National Conference and the development of the model laws and the other mentioned publications. This approach, however, is not limited to strictly weights and measures activities.

An excellent example of the voluntary and cooperative approach may be found in the Bureau's labeling program for household appliances and equipment to effect energy conservation. The goal of this program is to encourage manufacturers voluntarily to provide consumers, at the point of sale, with information in the form of labels attached to the appliances which reveal the energy consumption and energy efficiency of those appliances. These labels include a system intended to make it possible for consumers to compare by cost or otherwise the energy consumption and energy efficiency characteristics when purchasing household appliances and to select those that can effect savings in energy consumption.

Another example is the Bureau's development of voluntary product standards. This program of long standing at NBS covers the development of voluntary standards under a set of published procedures for products, packages, processes, and materials. Mr. William Cavanaugh, who follows me to the platform this morning, will discuss in some detail the voluntary standards system in the United States.

A new program soon to get underway at the Bureau which will use this same approach is the national voluntary laboratory accreditation program The goal of this program is to provide, in

cooperation with the private sector, a national voluntary system to examine upon request the technical competence of private and public testing laboratories that serve regulatory and nonregulatory product evaluation and certification needs. The program is also intended to accredit those laboratories that meet the qualifications established under certain published procedures and to require those laboratories that are accredited to maintain an acceptable level of competence.

Moreover, the cooperative approach which up to now has been ascribed to NBS activities carried out under its Organic Act is not simply limited to that Act. It pervades every statute under which NBS carries out an activity.

The Fair Packaging and Labeling Act, referred to earlier is a fine illustration of this point. The requirement imposed on the Secretary of Commerce under section 9 of that Act to furnish a copy of each regulation promulgated under that Act to state officers is but another example of cooperation with state authorities to promote to the greatest practicable extent uniformity in state and Federal legislation of the labeling of consumer commodities.

Section 5 of that same Act provides yet another example of the voluntary and cooperative manner of reducing the undue proliferation of weights, measures, or quantities in which any consumer commodity is being distributed in packages for sale at retail and such proliferation impairs the ability of consumers to make value comparisons with respect to such commodity. In those cases the Secretary of Commerce shall request manufacturers, packers, and distributors of the commodity to participate in the development of a voluntary product standard for such commodity under the procedures of the development of voluntary product standards.

Other examples could be shown. These would include the Bureau's work for the Consumer Product Safety Commission to help develop test methods for use in safety standards covering such products as toys and flammability standards for the children's sleepwear; work done for the Energy Research and Development Administration to evaluate promising energy-related inventions; development of a performance standard for police riot helmets for the Department of Justice; development of calibration standards for measuring automobile exhaust emissions for the Environmental Protection Agency; measurement of tire noise for the Department of Transportation; and many more.

These other activities which I have cited are intended to show, like the activities cited earlier that pertained more directly to weights and measures activity, that the Bureau's work is of this cooperative nature in areas other than those having to do with weights and measures. These, then, are the results of the Bureau's efforts in both areas of endeavor through use of the cooperative approach.

The other half of that question remains—has the cooperative approach been effective?

Each of you who has worked or had some association with NBS is well qualified to answer that question in your heart and mind. In my mind, the answer is a resounding yes. Because you deal with the public, you are in a unique position to determine the public's needs. Through your cooperation in working with NBS, we have jointly gained the public's respect and admiration in the area of weights and measures activities and acceptability of our proposed standards, model laws and regulations.

Early in my talk I posed some questions about what should be the Bureau's role in establishing weights and measures laws and regulations. It should be obvious by now that that role is somewhat of a mixed bag. Obviously, the Bureau is constrained by the limits of its statutory authority—whether set out in its Organic Act or any other statute under which it is assigned some responsibility. I do not, however, intend to use those constraints as a "cop out," for I do have some definite views where our responsibilities lie.

NBS has, as we have seen, no regulatory or enforcement powers and must therefore seek to gain acceptance of its standards setting activities through cooperative interaction with the states and the business community. However, it can and should exercise the qualities of leadership. That means we must be aware of the needs, desires, and problems of the weights and measures community. Through our own efforts we must be able to offer counsel, assistance, suggestions and a recommended course of action to deal with those needs and problems.

One of the qualities of leadership is a keen recognition of responsibility. That means being aware of the effects or potential effects of the action one is about to take. The establishment of a standard or regulation—especially a weights and measures standard or regulation—affects the lives and wellbeing of a great many people. Such a standard or regulation, even though voluntary in a technical sense, becomes upon adoption by the National Conference on Weights and Measures and subsequently by the states and local communities a law or regulation which must be obeyed. Action at the final level therefore affects the manufacturer of the item or equipment involved, his employees and his suppliers, the method of operation by thousands of weights and measures officials in carrying out their inspection and enforcement responsibilities, innumerable distributors and retailers, and probably millions of consumers.

Embarking upon a course of action affecting that many people is an awesome responsibility even though we are in no sense talking about life and death matters. Competent leadership acting in these

areas will want to move with care if it is to exercise sound judgment. This means seeking opinions of those segments of the business and technical sectors of our society who are going to be affected by the action being contemplated.

In short, economic, social, environmental, enforcement, and technological practicability considerations must be carefully examined and evaluated before any final action is taken. One way to do that is by attempting to obtain a consensus of opinion and support for the action being planned. Under our form of government, that means activity soliciting and genuinely listening to the views of a broadly representative segment of the society that will be affected by a particular law, standard, or regulation so as to assure that due process has been afforded to all interested parties. In a word, this means acting cooperatively with others and seeking to obtain the cooperation of those whose support will be needed to make a proposed standard or regulation effective, meaningful, acceptable, and used by those to whom it is directed. Such cooperation can be gained by providing appropriate direction or guidance where needed.

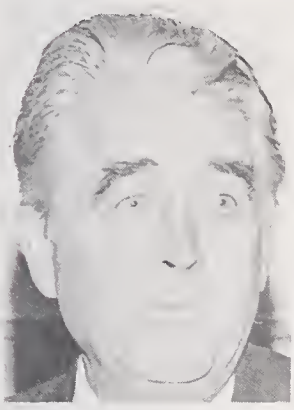
I think we can fairly assume that as a practical matter a combination of all of these roles—that of a leader; seeking the cooperation of others; and acting as a moderator when necessary—is, in the final analysis, the true statutory role of the National Bureau of Standards in the establishment of weights and measures standards and regulations.

The working together of Bureau people with the people of this Conference in seeking to implement the statutory authority of NBS and the meaning it has for all of us is the perfect formula on which the title of my talk is based. As I have indicated at the outset of my talk, the initials "PMTD" in the title mean "People Make the Difference." The phrase itself sounds so simple, but in reality it is the most difficult one to execute. The interaction of people working together is best exemplified by those of you who have served this Conference through the years. You indeed have made all the difference. Without your support, your interest and dedication to the goals and objectives of this Conference, none of its past achievements would have been possible. The goals and tasks that you will set for yourself at this Conference will be made easier and more effective if you take not only the information you have obtained here, but also the realization that these goals will be more easily achieved if you will carry with you the thought that in the long run people working together make the difference. In that way the future accomplishments of this Conference will be as significant as those already achieved.

Whatever direction our future effort takes, we will continue our close interactions with state and local weights and measures officials. We need and seek your help in identifying problem areas, and in assessing proposed solutions. We welcome your cooperation. You may be assured of ours.

AMERICAN SOCIETY FOR TESTING AND MATERIALS—VOLUNTARY CONSENSUS STANDARDS

by William T. Cavanaugh, Managing Director, American Society for Testing and Materials, Philadelphia, Pennsylvania



I can't think of a better theme for a talk at the Sixtieth National Conference on Weights and Measures than that of cooperation to achieve common goals. That is the very heart and soul of this Conference. You ladies and gentlemen have gathered here from every corner of our land in a cooperative effort to guard and enhance the integrity of the measurement system of this Nation. It's a job that can be done only through cooperation. The whole Nation benefits from what you do here.

Two words come to mind when I walk into a meeting like this and get a feel for what is happening: openness and participation. This Conference is open—open to people, open to ideas. Its lifeblood is participation—those who are interested come here and participate to make things go. But an open door is pretty meaningless unless the participants show up. That thought puts me in mind of one of the popular slogans the anti-war activists were using a few years back: "Suppose they gave a war and nobody came?"

Openness and participation also happen to be two concepts that lie at the heart of our Nation's voluntary consensus standards system. If standards are to be accepted and used in the marketplace (and unless they are, there is little point in developing them), they had best be developed in an open forum in which all those affected by the standards can participate. Of course, government can always mandate standards but it seems to me that things always work out better if the mandate is preceded by the greatest possible degree of openness and participation in the procedures used to develop the standards.

Let me give you an example of what I mean. About a year and a half ago, as one of the many responses to the newly discovered energy crisis, the Federal Government, with the very best of in-

tentions, published a new standard and asked that all the states comply. The standard stipulated that, henceforth, the maximum speed permissible on the Interstate Highway System would be 55 miles per hour. There was no question of the technical validity of the standard; enormous amounts of gasoline would be conserved. The standard appeared to be a reasonable one.

But what happened? Within three weeks from the time the standard was implemented, there was great tumult in the land. There were riots. There was shooting. Highways were blocked. Trucks carrying essential goods from the Midwest to the East had to be convoyed, like merchant ships scurrying through a submarine pack during wartime. Five people in my home State of Pennsylvania were killed. Why? Because one important party with a great interest in that standard had not been consulted before it was mandated.

As we all know, that party was finally consulted, and the problem was resolved. If only at the outset the government had used the approach that you are using here, and the approach that we have used so successfully for so many years in the voluntary consensus standards system, that problem could have been avoided.

One explanation we hear so often for people's reluctance to use procedures involving openness and participation is that they are too time-consuming. Well, that's true. They are time-consuming. So are all democratic processes. We don't often hear anyone complimenting the United States Congress for the speed of its accomplishments. But to paraphrase, I believe, Winston Churchill, democracy may appear to be a terribly cumbersome and inefficient system, but the difficulty is, it's the best system around.

I believe we can make the same claim about the voluntary consensus standards system. It has been said that standards are "little laws." If that is true, and I believe it contains a great deal of truth, then it follows that the most effective process for developing these little laws is one involving the greatest possible degree of openness and participation. Such a process is at the heart of the voluntary consensus system.

This is not to say that the system has solved all its problems—not by any means. We have not yet been able to provide the degree of openness that we would wish; some who would like to participate cannot. And we have not yet been able to attract the degree of participation that we would wish; some who should participate do not.

It is one thing to provide openness in theory; it is another thing to provide it in practice. The difference, as in so many things in this world, is primarily economic. To say that the system is open to participation by all may be a little bit like saying (and I ex-

aggerate to make the point) that anyone in this country is free to buy a Cadillac.

It is entirely true, for example, that participation in the work of an ASTM standards-writing committee is open to all interested parties, but some parties are more equal than others. The ASTM door is open, but not everyone can afford the trip. The XYZ Corporation most assuredly finds it more feasible to participate in ASTM committee work through a representative than does the ABC League of Consumers, simply because it has much greater resources. An engineer working in a testing laboratory for a giant retailer finds it easier to get to a meeting in Los Angeles than does an ordinary consumer in Omaha. And so it goes.

ASTM faced up to this problem several years ago and found itself wanting. So we instituted a new program—the first of its type, I believe, in this country, and possibly anywhere, and quite possibly still the only one of its type. Our Board of Directors appropriated money to subsidize participation in our standards-development work by those who could qualify to represent the under-represented consumer but who had no source of funds to support their participation. The subsidy includes the out-of-pocket expenses incurred in attending meetings of ASTM standards committees. In the process of doing this, we struggled with the age-old questions: Who is the consumer? Who represents the consumer? What does the consumer really want? Incidentally, that last question has always seemed to me to be on a par with the wistful question (was it Freud who asked it?): What does a woman want? You can no more successfully generalize about consumers than you can about women.

As I say, we struggled with these questions, but we didn't wait for the answers before taking action. That has too often been the pattern in some organized endeavors to "do something" about the consumer question. Someone is sure to say, "First, let's define what we mean by 'consumer'." Then the wheels grind to a halt while the group rides off in all directions through the woods to see if it can tree a definition.

So, in the matter of openness, ASTM has put its money where its mouth is. True, the amount of money is modest. But the principle has been established, and I believe the effectiveness of this program has been amply demonstrated. Who do we consider qualified to represent the voice of the consumer in our standards work? We consider representatives of the institutionalized consumer movement in this country, certainly; some people from the universities; state and local purchasing officials. We have found a rich source of such talent from among the membership of the National Institute of Governmental Purchasing and the National Association of State Purchasing

Officials. It seems to us that a person who buys hundreds of vacuum cleaners for schools and hospitals is at least as interested in getting a good deal as is the housewife in Dubuque. And he is doubtless a good deal more competent to hold his own as a participant in standards-writing.

In the matter of openness, then, we are making some progress. In the matter of participation broadly, we have another set of problems. Many of these problems, I believe, stem from a recent minor explosion in governmental regulatory activity on many fronts. It is by now a cliche to list them: the environment, occupational safety and health, consumer product safety and performance.

With regard to these activities, I wish very briefly to make three points. First, even though the end product may be a governmental regulation—a mandatory standard, if you will—it still seems to me that the voluntary consensus standards system very often has a distinct role to play. Second, whenever in the pursuit of public policy a new area must be opened up to governmental regulatory activity, there is always the possibility that we will sweep into the standards orbit literally thousands of managers in and out of government whose ignorance of the standards system in this country is complete. They have no idea what it is, how it works, how it can be used, and what its potential is. Third, even among those who are familiar with the voluntary standards system, and I am thinking now primarily about those in government, there is often a reluctance—because of budgetary pressures, or because of the sneaking feeling that attendance at working committee meetings is somehow tainted with the flavor of junketeering—to provide the strength of participation from government that the system must have in order to sustain a vigorous public presence. The system is not a private system: it is not a public system. It is truly a blending of public and private interests in the pursuit of public policy, and it must have strong representation from the public sector in order to survive.

Why do I believe so firmly that the voluntary consensus system has a role to play in developing the standards base for governmental regulatory programs? There are several reasons. First, the voluntary system is the place where the standards expertise from all segments of our society—government and industry, producer and consumer, regulated and regulator—come together and talk to one another in their common language. This does not ensure that every voice will be heeded, but that every voice will be heard. It ensures that nothing will be forgotten, that no single element in the system, in a well-meaning effort to achieve instant results, can run hell-bent toward the wrong goal line.

Another reason is that the standards base for governmental regulation quite often demands the best that our Nation has to offer in

the way of measurement technique; and, as no one in the world knows better than the people in this room, no element of our society has a corner on the science and the art of measurement. We need all the help we can get in devising the best way to measure the ozone in the upper atmosphere or the nitrous oxides in the lower.

Finally, as the example of the 55-mile speed limits shows, a regulatory program that is clearly understood by those to be regulated has the best chance for successful administration, and nothing increases the understanding of a program quite as much as an opportunity to participate in its development.

On the question of exposing new areas of management in the private sector to the benefits offered by participation in the voluntary consensus standards system, I suppose I must take my message elsewhere. But on the further question of increased participation by representatives of government at all levels, surely today I am speaking in the right hall.

One agency at the Federal level, the sponsor of this Conference, sets an excellent example. More than three hundred employees of the National Bureau of Standards—scientists, engineers, and others—actively participate in the standards development work of ASTM. No doubt there are many reasons for this. One reason must assuredly be that these standards experts know full well that an ASTM committee is one of the best places in the world in which to exchange notes with their counterparts outside of government and to experience all the benefits of such an exchange.

Representation from other levels of government is growing, but not nearly fast enough. One problem, which I alluded to earlier, is budgetary. The fire commissioner of Philadelphia, for example, is personally convinced of the benefits of his participation in ASTM committee work in the area of fire hazard standards, and he does participate. Two weeks ago he attended an ASTM meeting in Montreal. He used part of his vacation to do so. This should not be necessary.

Another problem, I am convinced, is simply that many officials at various levels of government suddenly find themselves responsible for programs involving the need for standards and are unaware of the enormous potential of the voluntary consensus system to help them. My plea to you in this room, who are knowledgeable about the system, is to help your counterparts in other agencies at your level of government by making sure that, when they are faced with the need for a wheel, they do not proceed to reinvent it. The standards wheel is in place, well lubricated, and ready to roll. All we need is to be pointed in the desired direction and to have the interested parties hop aboard. Let's do it together.

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY—THE EMERGING U.S. ROLE

by William E. Andrus, Jr., Program Manager, Office of Engineering and Information Processing Standards, National Bureau of Standards; United States Representative to the International Organization of Legal Metrology

It is ineed a pleasure to address the 60th National Conference on Weights and Measures, particularly in such a beautiful city as San Diego.

My discussion will be broken into three parts: first, I wish to provide you with some background information on OIML (International Organization of Legal Metrology), its aims and objectives; secondly, I will discuss NBS's role and our efforts to organize and plan for U.S. participation in OIML; and thirdly, and more importantly, I want to discuss with you the problems and opportunities posed to the United States by OIML.

OIML impacts upon roughly $1 billion worth of scientific and measurement instruments exported each year by the U.S. As shown here (figure 1), U.S. statistics for 1974 indicate exports of $248 million in engineering and scientific instruments and $675 million in measuring and controlling instruments (figure 2). Exports amount to about 25 percent of total domestic production for these instruments and increased an average of 25 percent over 1973. This $1 billion figure represents instrument hardware that is exported by the U.S. which may be affected by OIML recommendations.

However, we also have to look at OIML from the standpoint of measurement methods which are developed and incorporated into recommendations and which specify how instruments are to be used during the measurement process. For example, the U.S. is a large exporter of grain, some $8 to $9 billion worth a year. At present, OIML, in International Recommendation #8, recommends an air-oven method in the testing of grain moisture—a significant factor in determining the price of the grain. The OIML method calls for drying the grain during the test for two hours. The U.S. does not agree and recommends that the drying time should not exceed one hour. The USDA argument for this is that the longer drying time may be removing more than free water and may be costing U.S. exporters considerable sums of money. The differing test methods between U.S. and foreign ports tend to work to the disadvantage of the U.S. exporter.

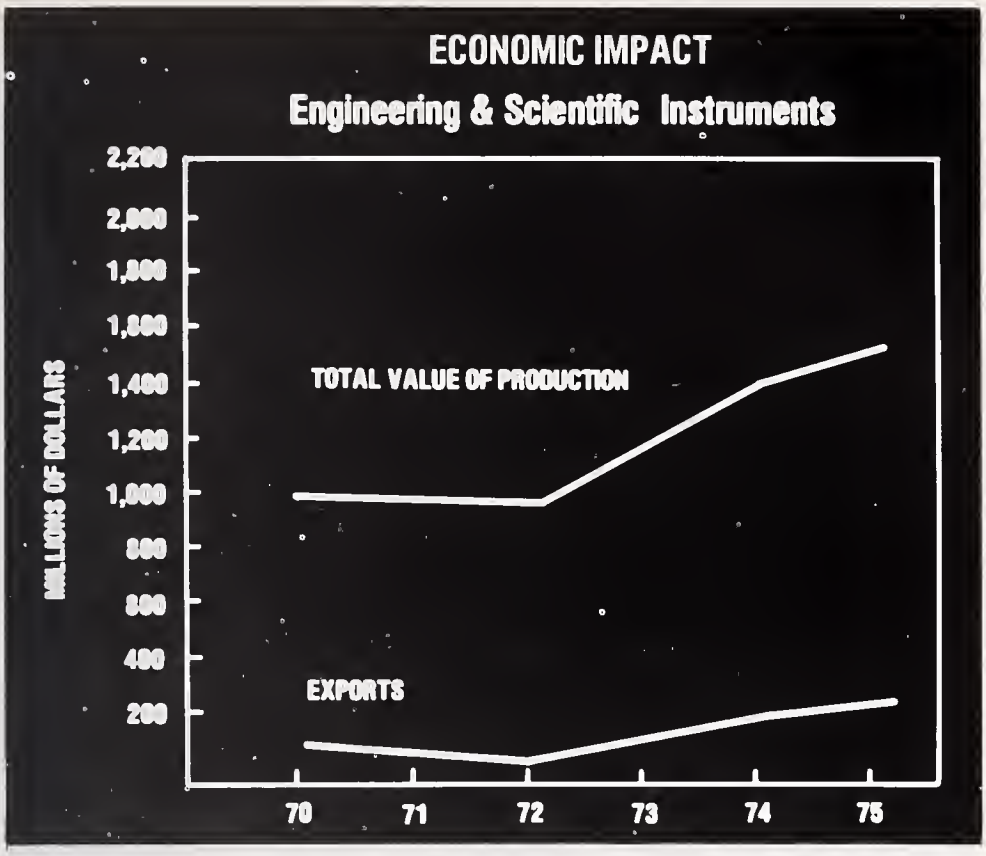


FIGURE 1

Thus, in considering the economic importance of OIML we must consider both instrument hardware and measurement methods. While we can say that the hardware represents $1 billion a year in exports, it is very difficult at present to determine the economic impact of differing measurement methods.

OIML was founded in 1955 by Convention. It is an intergovernmental organization which is now composed of the following 43 nations (figure 3). As you can see, all of the major trading nations of the world are members. The Organization has a reputation of being strongly European influenced and we have found this to be very true. However, I will cover this aspect of OIML later in my discussion.

OIML's generally recognized goal is to resolve international technical and administrative problems raised by the use of scientific and measuring instruments in the field of legal metrology. OIML defines "legal metrology" as: "That part of metrology which treats units of measurement, methods of measurement and measuring instruments, in relation to the mandatory technical and legal requirements which have the object of ensuring a public guarantee of security and of the appropriate accuracy of measurements (OIML Vocabulary)." As you can see, this definition allows for a very wide

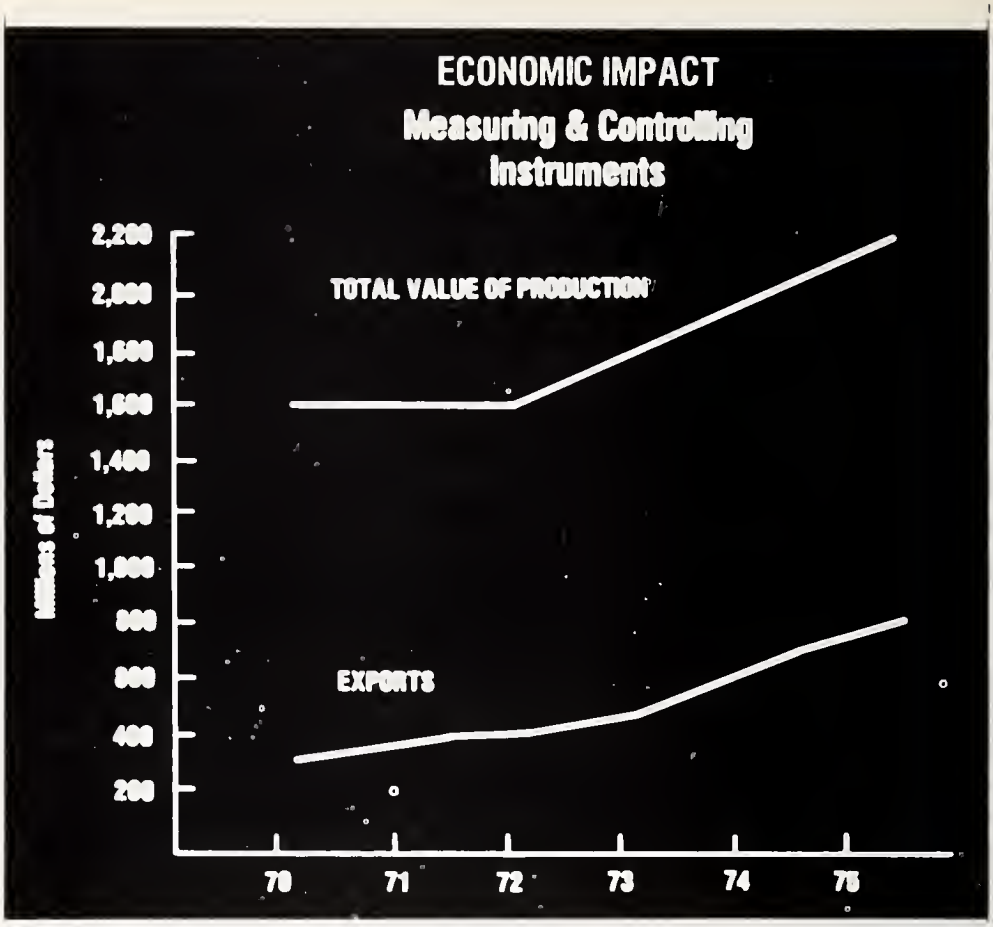


FIGURE 2

FIGURE 3

interpretation of the types of scientific and measuring instruments that could come under the definition. We find that there is constant debate within OIML as to what is or is not legal metrology and, therefore, subject to coverage by OIML. The rule of thumb generally is that if there is an expressed interest in developing national regulations on a subject and if the International Committee agrees on undertaking the new project, OIML will usually sponsor the work. As you know, the U.S. looks upon legal metrology as being commensurate with your efforts in the regulation of commercial weighing and measuring instruments. However, there are many other areas involving health and safety where measuring instruments are used in order to assure conformance with pre-established standards —which in some cases may be mandatory. Product safety and pollution measuring are two important examples of areas where regulations exist.

OIML objectives are as shown here (figure 4). It is important to understand that OIML does not develop typical voluntary standards as is the case with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). It develops model laws and regulations to be used as the basis of national laws and regulations of the member nations. As such, these international recommendations are written differently from voluntary international standards developed by ISO and IEC. For example, OIML recommendations usually specify accuracy classes for instruments based upon how the instruments are to be used. The recommendations usually also require an initial and subsequent verification of the instrument to assure compliance with metrological and technical specifications. In some cases, they will also provide guidance on the optimal frequency of inspection for the instruments.

FIGURE 4

Organizationally, OIML consists of (figure 5): first, the International Conference of Legal Metrology, which is composed of delegates from member nations and which meets at least every six years (the International Conference is the final authority in OIML for approval of international recommendations); secondly, the International Committee of Legal Metrology (CIML), which is composed of one delegate from each nation, and which meets at least every two years (the Technical Work Plan of OIML is carried out through the CIML).

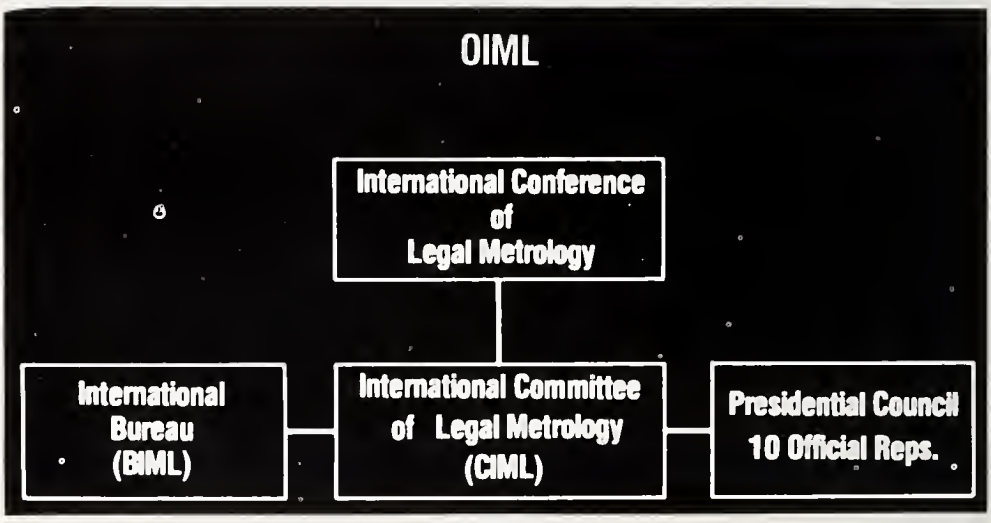


FIGURE 5

The president of CIML is Mr. van Male, director of the Netherlands Weights and Measures Office. Mr. van Male has a distinguished reputation in the field of weights and measures and is highly respected by OIML members. At the June meeting of CIML he was just reelected as president for another six-year term. There are two vice presidents who also were just elected; and I was fortunate to be named one of the vice presidents along with Mr. Ermakov of the Soviet Union who was reelected for a second six-year term. I replaced Mr. Honti, of Hungary, who is retiring and was made an honorary member of the International Committee.

The third organizational arm of OIML is the International Bureau of Legal Metrology (BIML) which comprises the central secretariat of the Organization. It is composed of a staff of approximately fifteen, and is located in Paris, France. BIML is headed by a permanent director, Mr. Bernard Athané, a young Frenchman with weights and measures experience who replaced the former director, Mr. Costamagna, the first of last year. As some of you probably recall, Mr. Athané addressed the 59th National Conference in Washington last year. His staff consists of professional metrologists and administrative aides who manage the Organization, arrange for

conferences, and so forth. Finally, assisting the president of CIML is a council comprised of ten official CIML representatives who serve at the pleasure of the president as a consultative committee. The council meets at irregular intervals as deemed necessary by the president.

As I have already stressed, OIML is a unique organization. Because it is intergovernmental, member nations are usually represented by individuals from government departments of metrology; in other words, by NBS counterparts from other nations. As mentioned, the outputs of OIML are model laws and regulations. Additionally, OIML members are "morally obliged" to implement OIML decisions. Now I would like to dwell a little on the term "morally obliged" because it has caused some confusion as to exactly what the United States is committed to do as a member of OIML. Actual written interpretations of "morally obliged" are few indeed. What is shown here is the extent of written guidance:

OIML Convention—1955—Article VII:

> "The latter (member states) shall be morally obliged to implement these decisions (Recommendations) as far as possible."

U.S. Secretary of State to the President—March 15, 1975:

> "Actions of the (International) Conference are in the form of Recommendations and are not legally binding but member states are morally obliged to implement decisions of the Conference as far as possible."

However, the question has been discussed at some length within OIML; and here is what is generally regarded as practical and acceptable to the United States:

1. The U.S. should exert "best effort" to harmonize national regulations with OIML recommendations, providing that there is general agreement on behalf of affected U.S. concerns that the changes are technically sound and that there are identifiable economic advantages;
2. Where national regulations do not exist on areas covered by OIML recommendations, the U.S. is not morally obliged to adopt such regulations in order to satisfy its obligation; and,
3. There are no sanctions, legal or otherwise, for not adapting the OIML recommendations.

I believe that under this interpretation, the U.S. has a rather wide latitude insofar as adopting OIML recommendations. As you know, the National Conference on Weights and Measures passed a resolution during its 1974 meeting which says that the Conference does not feel obliged to adopt OIML recommendations bearing on commercial weighing and measuring instruments unless the Conference, as a body, approves of the OIML recommendation and, secondly,

that the U.S. has cast an affirmative vote on the recommendation. I consider that it is well within the prerogative of the National Conference to take such a position; I do not consider it a breach of our moral obligation.

The OIML budget is as you see here (figure 6). The contributions paid by member nations are based upon population and the U.S. dues could not be considered execessive, particularly when compared to U.S. dues to ISO and IEC which are about $328,000 for 1975. The dues to ISO and IEC are paid by the American National Standards Institute (ANSI) whereas U.S. contributions to OIML are paid from State Department funds. Actually, OIML is going to have to face substantial budget increases over the next five years. Its current offices and secretariat staff in Paris are not large enough to accommodate the past and projected growth in the Organization.

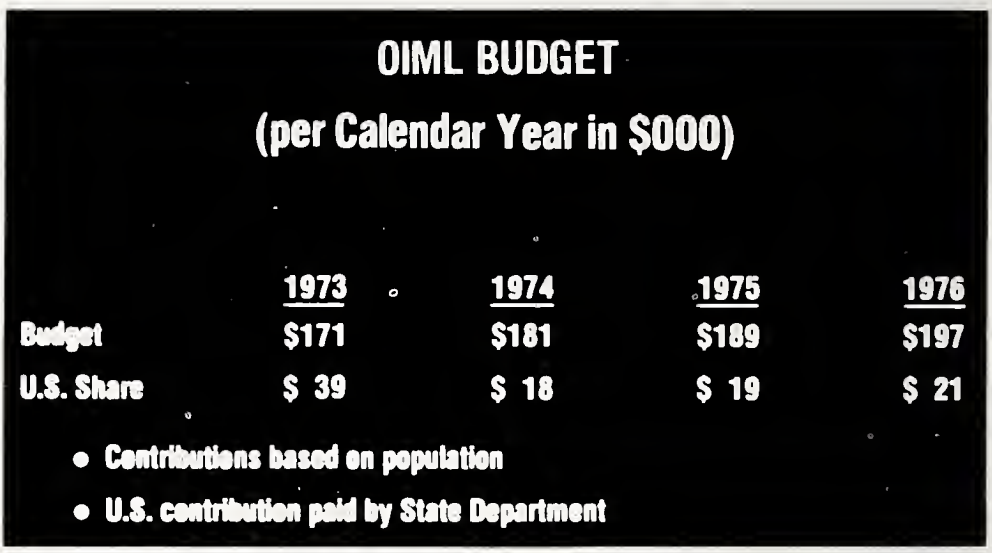


FIGURE 6

Now to the heart of OIML, its technical working program. Probably the simplest way of visualizing OIML's technical program is as a triangle (figure 7) divided into four interrelated parts. At the apex of the triangle is the International Conference of Legal Metrology which is the final authority for adoption of OIML International Recommendations. There are 34 recommendations at present and another 15 planned for adoption during the 1976 International Conference. Draft international recommendations going before the International Conference for vote must first have been approved by the International Committee of Legal Metrology (CIML). The CIML is the technical arm of the Organization and is responsible for the entire working program. Under CIML's direction, and only after its approval, technical committees (called pilot secretariats) and subcommittees (called reporting secretariats) are established. At pres-

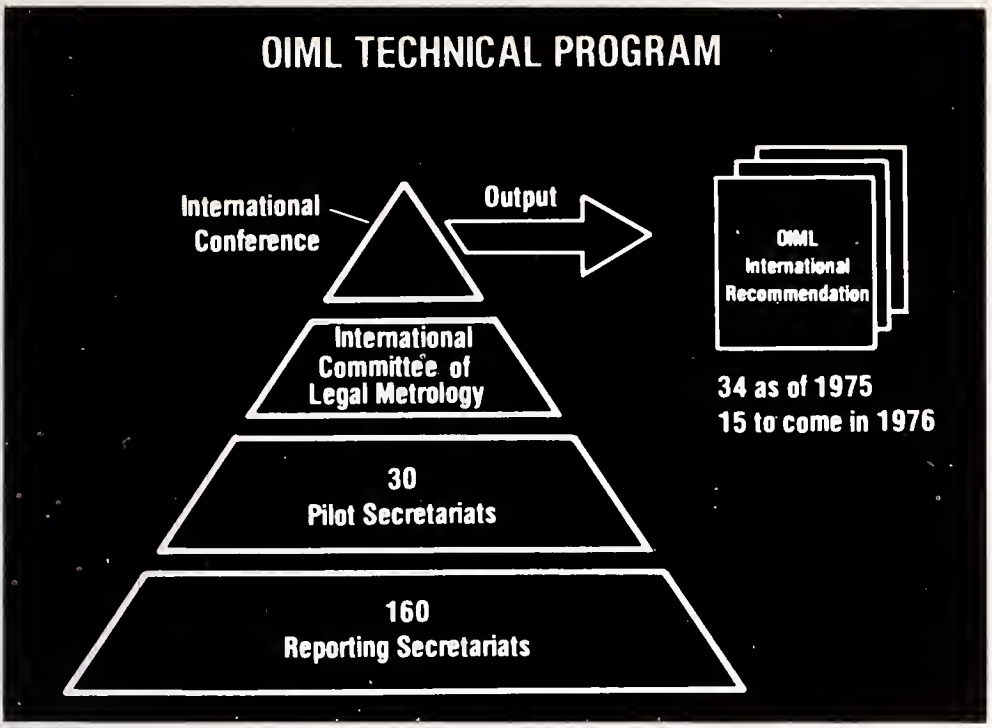


FIGURE 7

ent, there are thirty pilot secretariats covering broad subject areas and 165 reporting secretariats which actually draft the recommendations. These secretariats are administered by member nations on a voluntary basis. The pilot secretariat is responsible for developing a work plan for a given study area and for recommending individual working groups (reporting secretariats) to draft the recommendations. Thus, while the pilot secretariat does not itself produce draft recommendations, it is in a strong position to influence the final output of its working groups.

The Senate of the 92nd Congress recommended U.S. membership in OIML on the basis of hearings conducted in August 1972. Dick Simpson, at that time Acting Assistant Secretary of Commerce for Science and Technology, testified for the Department in favor of membership. Testimony was also given by various industry groups such as API (American Petroleum Institute), the Scale Manufacturers Association, and others. Basically, the main reason given for joining OIML was to protect the U.S. trade position with respect to scientific and measurement instruments. On the basis of testimony presented, the Committee on Foreign Relations recommended U.S. membership; and the U.S. became a formal member of OIML in October 1972. The U.S. objectives in OIML are as follows:

- To improve export opportunities.
- To influence the adoption of international recommendations.

- To keep abreast of evolving international measurement technology.
- To influence developing countries in their adoption of legal metrology practices.
- To facilitate U.S. involvement in international standards activities.

On the basis of the Senate hearings, responsibility for U.S. participation in OIML is subdivided as shown here (figure 8).

Program management is centered within my office. I serve as the U.S. repersentative to the International Committee of Legal Metrology. I have a special assistant, David Edgerly, who spends the vast majority of his time in the daily management of the program. We are assisted, of course, by experts throughout NBS and in private industry. There are four basic activities involved in our program. They are:

- Analysis of OIML technical documents.
- Preparation of U.S. technical positions.
- Participation in OIML working groups.
- Coordination of U.S. administered OIML secretariats.

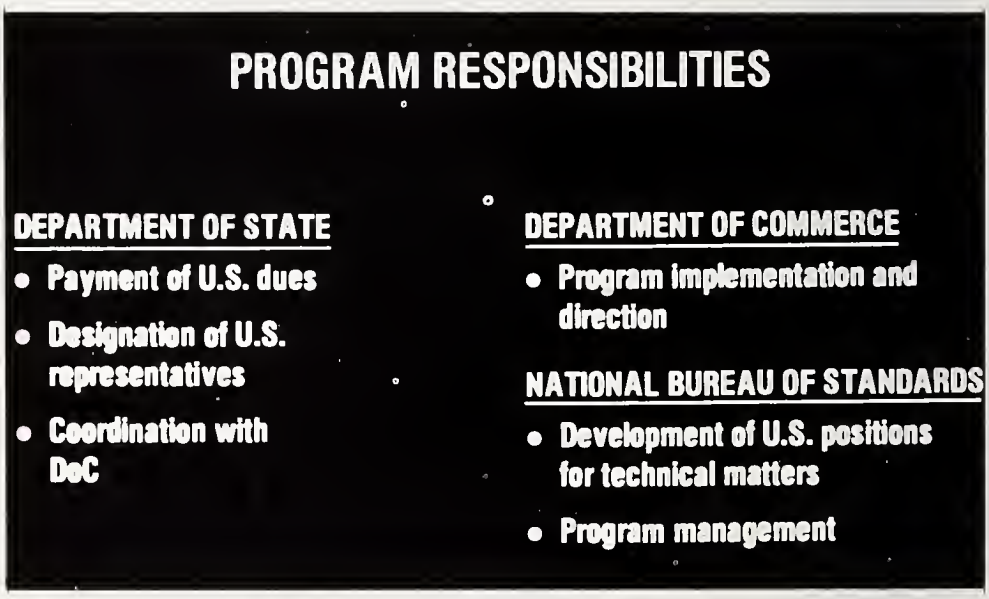


FIGURE 8

In order to assist NBS in managing U.S. participation in OIML, the government formed a public committee entitled the Advisory Committee for International Legal Metrology (figure 9). The committee is composed (figure 10) of approximately 20 members, representing the organizations listed here. The principal activities of the committee are to advise NBS on metrological studies, project recommendations, and international recommendations of the OIML. It

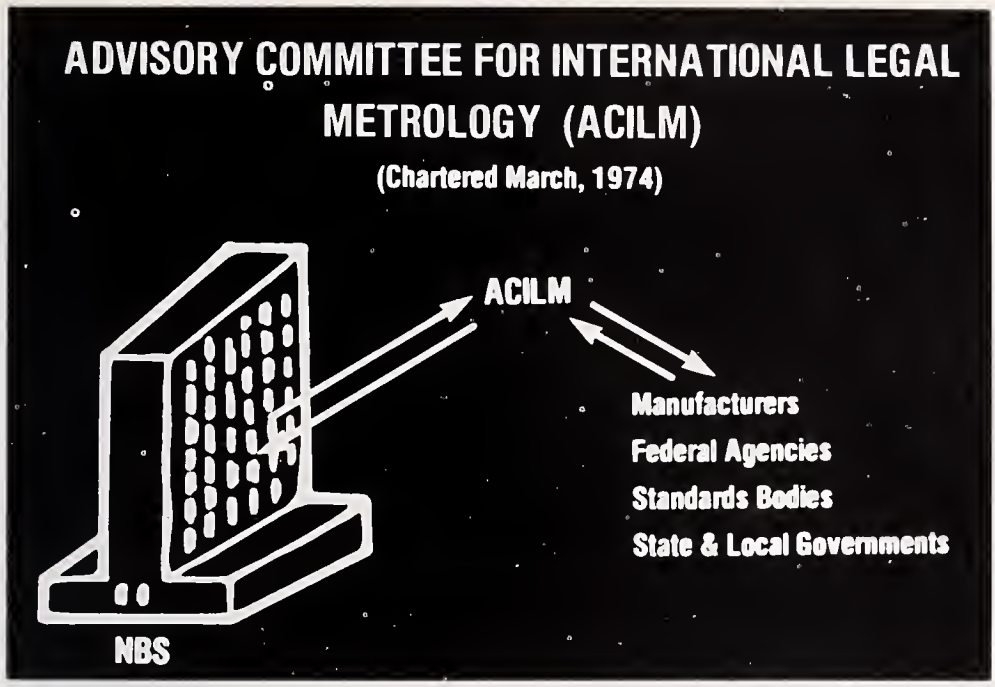


FIGURE 9

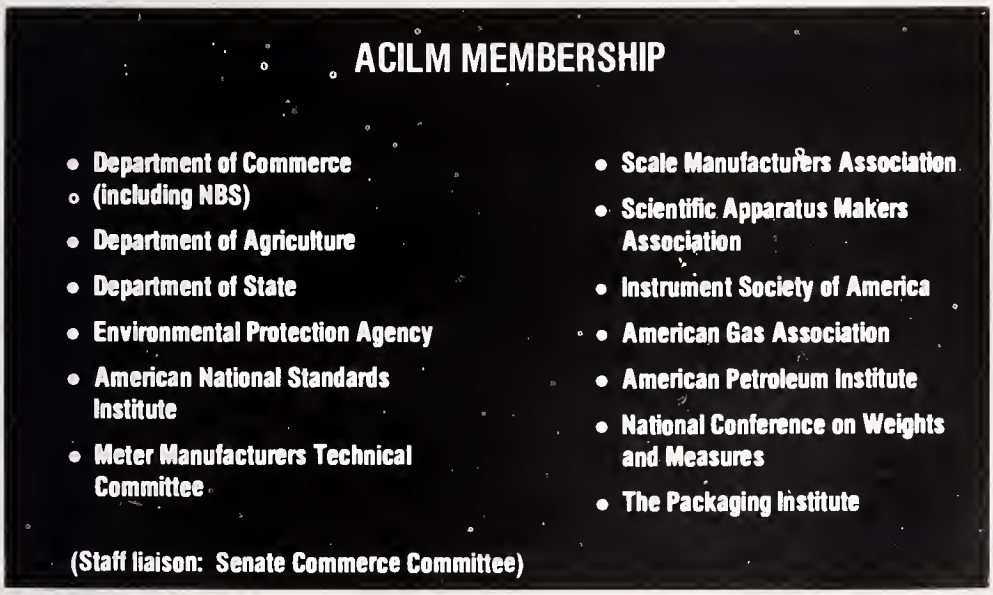


FIGURE 10

provides the widest possible opportunity for input by interested public and private sectors of the U.S. The committee also serves very effectively as the means for arranging private sector support of U.S. held secretariats in OIML.

This brings me to the final part of my discussion. The U.S. has now been a member of OIML for two and half years. During much of that time, NBS has been putting together a program for U.S.

participation in OIML, including the establishment of an advisory committee to guide the U.S. in its participation. The vital question is "Have the efforts to date paid off, and is the U.S. accomplishing its stated objectives in OIML?"

At this particular time, it is impossible for me to assure you that the mere presence of the U.S. in OIML will enhance our exports of scientific and measuring instruments X percentage over the next five years. It would be nice if the situation were that clear cut where a 10 percent expenditure of effort in OIML would yield a commensurate 10 percent increase in exports. Instead, what I will say to you is this: U.S. manufacturers of scientific and measuring instruments do face hardships because of OIML recommendations and these hardships cost dollars of trade that are lost. In just a minute I will outline some of the specific problems. The second thing I want to say is that the problems that exist are the result of two forces in OIML: first, the U.S. has an enormous task in overcoming the predominantly European influence in OIML, particularly as it relates to bloc voting by EEC member nations; and secondly, the U.S. has a formidable job in swaying technical opinions away from rigid design requirements for devices to performance requirements. And I might add that inherent in the problem of design versus performance is the widespread European insistence on pattern or prototype approval of devices as a means of insuring performance. As you are probably aware, other than a small voluntary program going on in our Office of eWights and Measures, the U.S. has no national pattern or prototype approval program. This represents a future problem for the U.S. in OIML, and one that this oCnference will have a hand in solving.

Let me now point to some examples of the problems we currently face in just a few areas where draft recommendations are pending. The devices involved are volumetric provers, household water meters, and belt-conveyor scales. In the first and last instance these devices are a U.S. export item. In the case of water meters, they are not exported at present to any great extent, but we are told that a future export possibility does exist.

In the case of volumetric provers, the U.S. currently exports to about 12 OIML member nations. The type of prover I am talking about is a five-gallon capacity standard field test measure as shown here (figure 11) being used by a weights and measures inspector during the test of a retail fuel dispenser. The draft OIML recommendation is unacceptable to the U.S. It requires that the device be constructed only of metal, which would eliminate fiberglass, a completely acceptable substitute which is now being used in the U.S. The recommendation sets specific heights and internal neck diameters of provers that are inconsistent with U.S. practice. We prefer

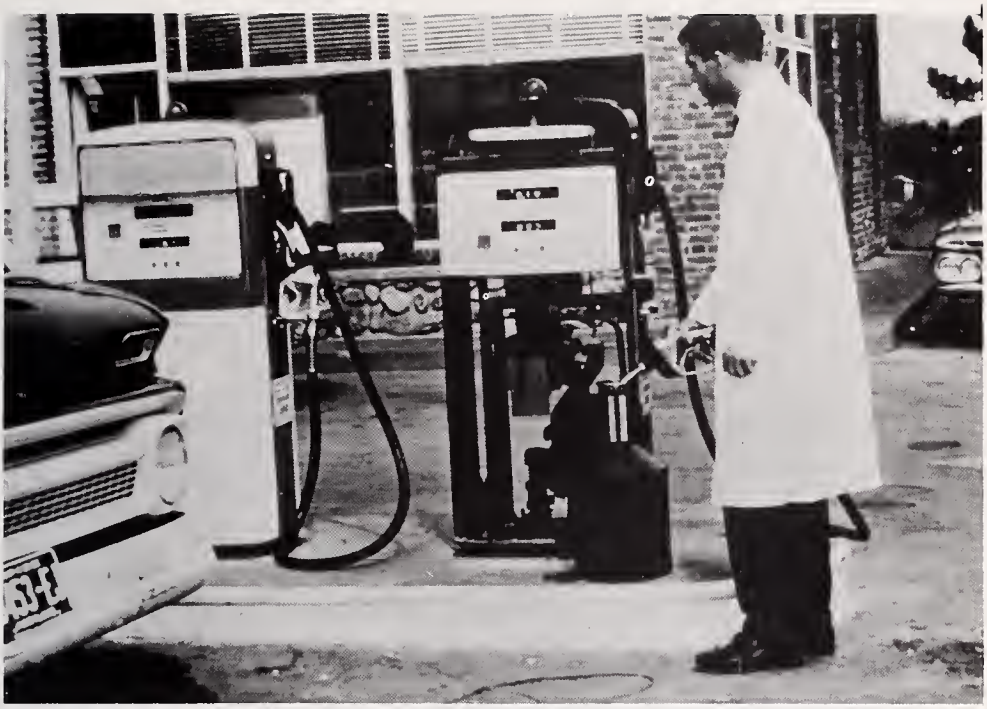


FIGURE 11

to set dimension ranges that will allow for the construction of a wide variety of provers for special purposes in the field.

Additionally, the OIML recommended method for calibrating the device is different from U.S. methods. All things being considered, our manufacturers estimate that the cost of producing the OIML prover would be around $150 as compared to $50 for current U.S. provers, and they agree that there appears to be no metrological advantage in moving to the more expensive prover. The U.S. evidently is not the only country with problems over these provers. In a rare instance France and West Germany also disagree with the draft, which was prepared by India, and so it must go back to committee for revision.

In the case of household water meters, the U.S. manufactured meter is totally excluded from consideration by the OIML draft recommendation. The secretariat is held by the United Kingdom and the device I am speaking of is the household water meter shown here (figure 12) in common use throughout the United States. The draft recommendation established classes of water meters according to range of the load as shown on this chart (figure 13). As you can see, there are five classes ranked according to their level of accuracy which are recommended for use in national regulations governing these devices. The American Water Works Association has plotted for us where currently manufactured U.S. meters fit relative to these

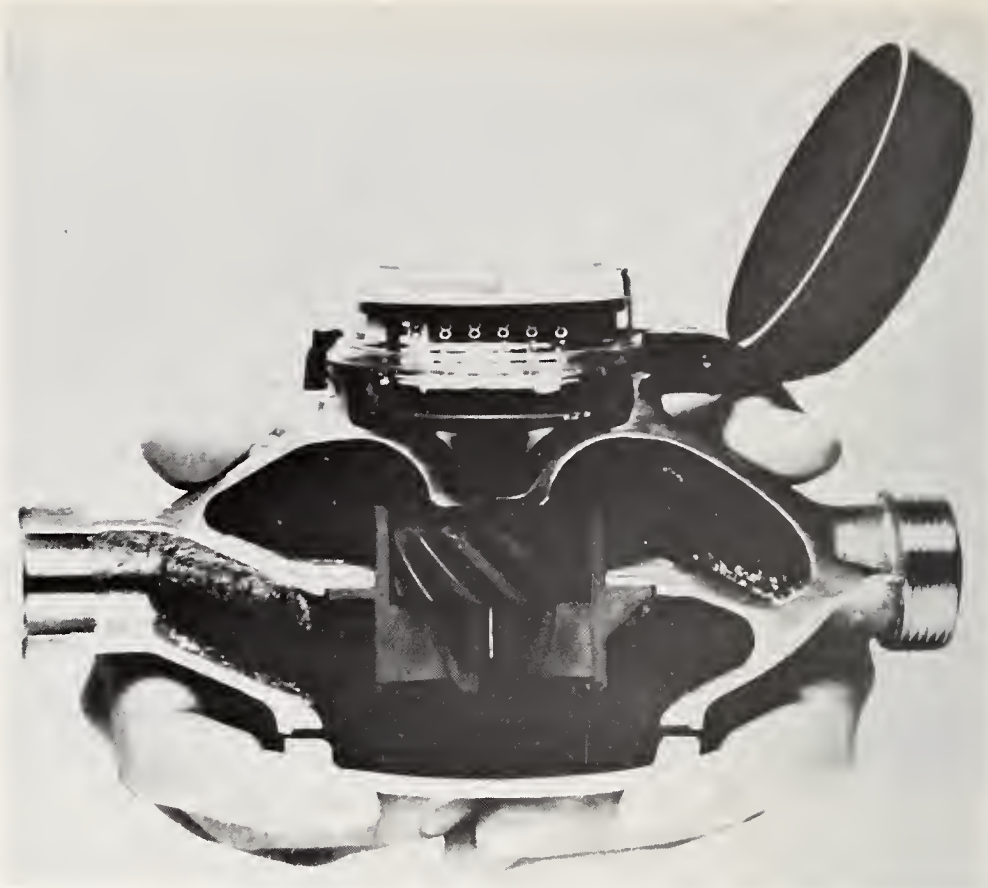


FIGURE 12

classes. As you can see, they are all outside the recommended classes. Therefore, if this recommendation were adopted today, U.S. meters would be totally excluded from foreign markets.

The recommendation was voted upon during the CIML meeting in June and, fortunately, did not get adopted. However, there were enough "yes" votes for adoption. What killed it was that many of the developing nations had not reviewed the document and, therefore, abstained from voting. Hence, a large number of abstentions killed the draft and not the 3 "no" votes that were cast by the U.S., Australia, and Venezuela. We are optimistic, however, that we can obtain changes that will solve the problems we have with the draft before it is voted on again next year.

My last example, concerning belt-conveyor scales, is a beautiful case demonstrating OIML's infatuation with rigid design requirements for devices and bloc voting by Common Market members of OIML to protect EEC interests.

OIML recommendations have a characteristic of being overly concerned about how a device should be designed. From a U.S. point of view this type of thinking creates two major problems: first, it tends to lock in technology to certain design requirements; and secondly,

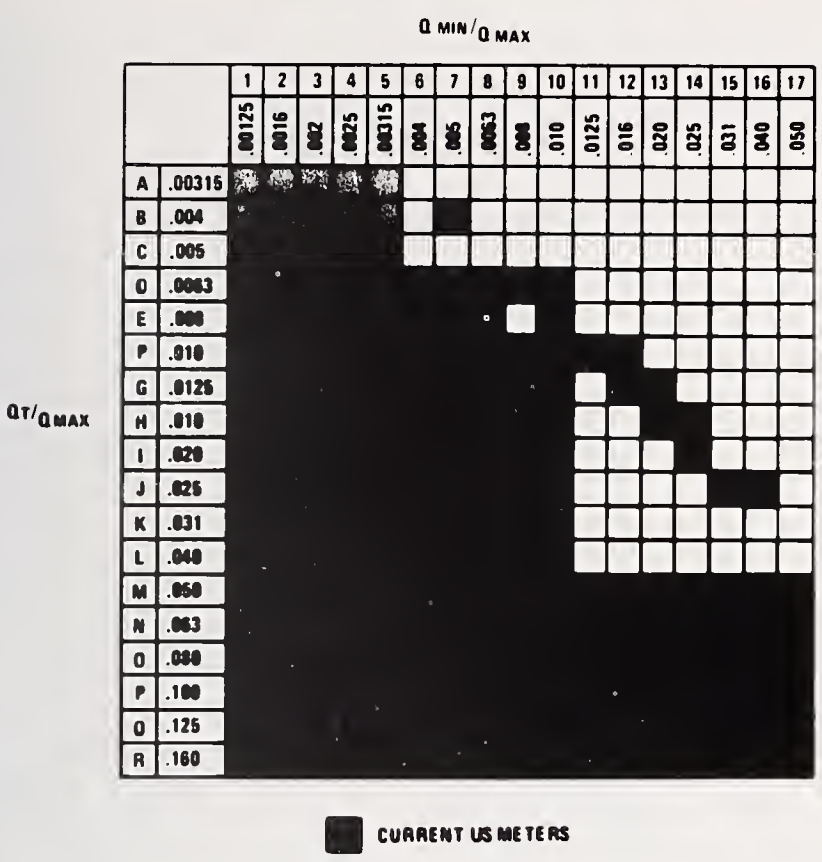


FIGURE 13

it stifles innovation. For example, over objections from U.S. delegates attending a recent meeting on belt-conveyor scales in London, the working group imposed requirements that would limit the length of the belt on a belt-conveyor scale system to 100 meters. This was done under the misconception that this would insure that a belt-conveyor scale would operate within an accuracy limit of 2 percent permissible error.

There are belt conveyors in the U.S. (figure 14), such as shown here, with belt lengths of 500–1000 meters capable of maintaining an accuracy within tht 2 percent permissible error. These will be unacceptable in Europe if the draft recommendation is adopted as written.

The U.S. position was voted down in this instance by a bloc vote of Common Market countries attending the meeting. The U.S. was similarly voted down when it attempted to have weight chains (a series of known weights linked together to form a mass standard) introduced into the draft recommendation for use in simulation tests

FIGURE 14

to calibrate a belt-conveyor scale. The weight chains as shown here on a belt system (figure 15) are a convenient and economical method for testing belt-conveyor scales, particularly those in remote locations, without having to use product on the belt.

Now we come to the final and crucial question, "What can the United States do to overcome the problems just discussed?"

FIGURE 15

Let me say first that I think that OIML is currently where the National Conference on Weights and Measures was twenty to twenty-five years ago, in terms of facing the tremendous task of bringing about uniformity within the U.S. on weights and measures laws and regulations. Only, OIML is concerned with uniformity among 43 nations. Hence, we are looking at years of effort ahead before we can expect the kind of cooperation internationally that currently exists on a national scale here in the U.S.

The strategy we are planning for the U.S. is based upon three very clear and simple concepts. First, the U.S. must seek out and hold important committee secretariats within OIML. This provides us with the leverage to influence the final outcome of draft international recommendations. You will recall that there are 30 pilot and 165 reporting secretariats within OIML at the present time. Here (figure 16) is the current breakdown as to how these secretariats are distributed. As you can see, in the two and one-half years that we have been a member of OIML, the U.S. has been able to capture more secretariats than any other nation. You may think we have moved too fast and perhaps "bitten off more than we can chew," but look at it another way (figure 17). This shows the distribution of voting patterns. You will recall my earlier remarks on bloc voting and its influence in OIML. This shows a little more clearly what we are up against, even though as a single nation we hold more secretariats than any other OIML member.

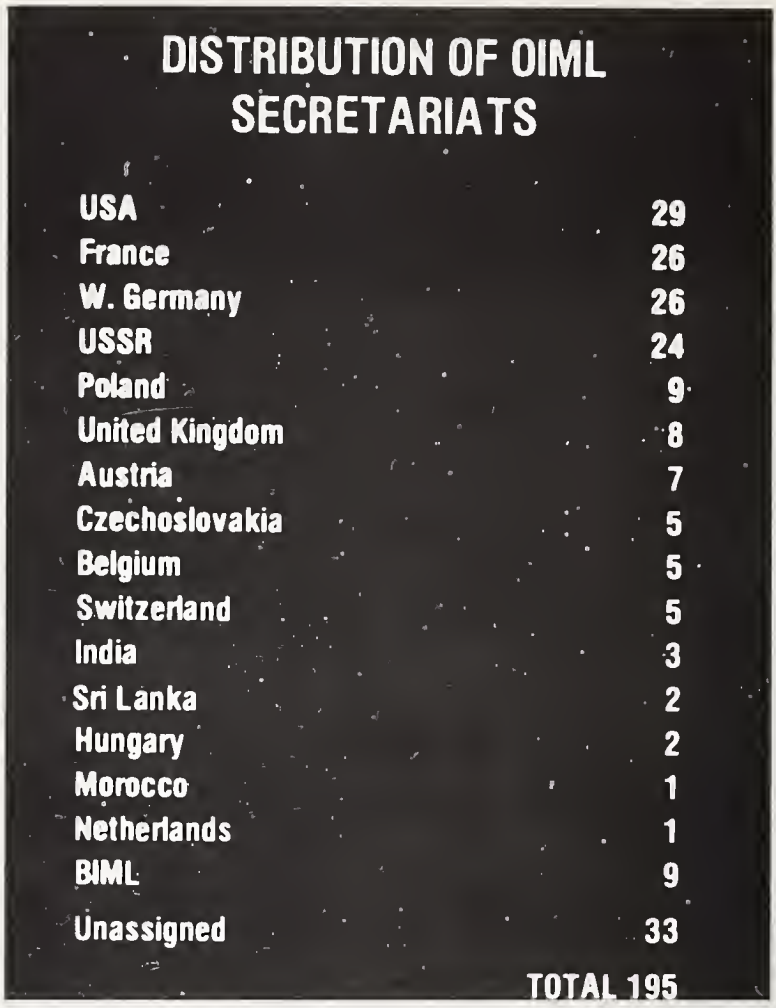


FIGURE 16

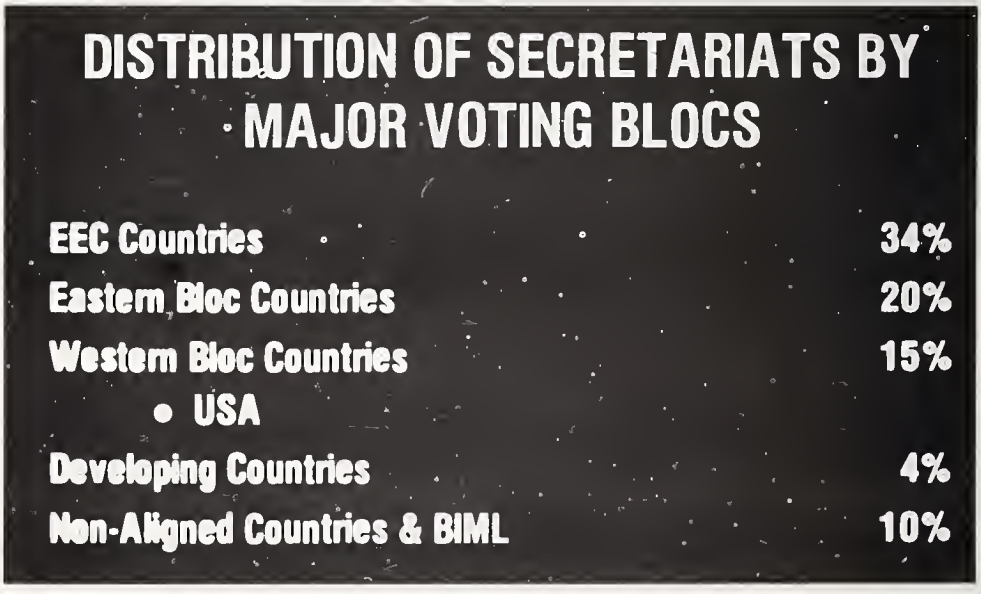


FIGURE 17

The second strategy is, quite simply, to get American industry actively involved in the U.S. program for participation in OIML. After all, it is our industry in the long run who stands to gain the most from international uniformity in the scientific and measuring instrument field. As you can see from the distribution of secretariats within the U.S. (figure 18), our industry is becoming actively involved; and I think this is largely due to the efforts of our Advisory Committee in attracting the interest of U.S. manufacturers.

Lastly, the U.S. must continue to develop well thought out technical positions on OIML recommendations. In instances where there are conflicts between an OIML recommendation and U.S. practice, we must be able to offer sound and saleable technical proposals in support of U.S. arguments for changes. It is of little purpose for the U.S. to criticize a technical document unless we are prepared to offer reasonable technical alternatives.

FIGURE 18

Recently, OIML announced that 18 international recommendations that were adopted in 1968 would be open for revision during 1975, and that interested member nations should submit requests for revision. This provided the U.S. a unique opportunity in that all 18 of these recommendations had been adopted in 1968, prior to U.S. membership in OIML. Therefore, we had had no input into their development. Working through the U.S. Advisory Committee, we spent approximately six months canvassing industry and government to develop proposed technical changes to the recommendations. The effort involved several hundred industry and government experts and the results were interesting. Of the 18 recommendations, 16 required major changes and/or were totally unacceptable to the

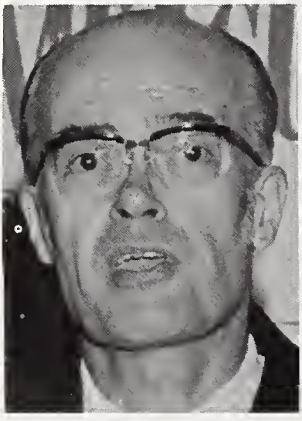
U.S. A lengthy report was prepared requesting revisions and was sent to all 43 member nations. We are very optimistic that we will win many of the technical points raised. This kind of effort must continue if the U.S. is to be effective in OIML. It is time consuming, costs valuable resources, but is absolutely vital to our effective participation in OIML.

I am optimistic that the U.S. can look forward to a good working relationship with OIML member nations. I believe that on the basis of what we have accomplished to date in OIML, other nations are convinced that the U.S. wishes to assume a leadership role in the Organization. However, this will involve the cooperation of all of you in this room. In summary, the National Conference on Weights and Measures has an important responsibility internationally to promote U.S. measurement technology. It is a task you know well for you have been doing it on a national level since 1905.

Thank you for your cooperation to date, particularly that provided by Jim Lyles, your representative to our Advisory Committee. Thank you also for the opportunity of returning to San Diego and meeting with you here today.

CONVERTING TO METRIC STANDARDS IN CANADA

by John L. Armstrong, Chief, Standards Laboratory,
Department of Consumer and Corporate Affairs, Ottawa, Canada



The year 1975 is a significant one for legal metrology in Canada. Dominion Day, July 1, marked the centenary of the proclamation of Canada's first Weights and Measures Act in 1875. The year 1975 is also the centenary of the signing of the Treaty of the Meter.

I rather wish I could state that 1975 marks the completion of metric conversion in Canada, but it would be more accurate to say that it marks the end of the preliminaries.

While metric units of measurement have been legal for use in Canada since 1875, and there has been a progressive trend towards their adoption in certain industries in recent years, the opening gun in the major push towards SI—International System of Units—was not until the presentation to Parliament in January 1970 of the White Paper on Metric Conversion. At that time, while it was presented in the form of a policy statement by the government rather than of a bill of enactment, it received the unanimous support of all parties. It provided for the

formation of the Metric Commission which was to coordinate planning for a voluntary program on metric conversion.

On March 17, 1975, the Minister of Industry, Trade and Commerce, to whom the Chairman of the Metric Commission reports, presented to Parliament a set of guideline dates for metric conversion based on industry planning. The key dates were:

1974:	completion of the investigation phase;
1975:	completion of the planning phase, with definition of the proper sequence of conversion activities;
1976:	completion of the detailed scheduling phase, with establishment of optimum timing of conversion activities;
1975 through 1980:	implementation, the actual physical work of conversion, peaking in 1977–78 and substantially completed by 1980.

It is the considered policy in Canada that the actual physical process of metric conversion should follow rather thorough planning and preparation. The preparative phase is not by itself disruptive or very expensive; and to the extent that is done well, the actual work of conversion can be relatively swift and painless.

What we do not want to see is metric conversion stuck on top dead center, with the industrial leaders, particularly those with multinational interests, trying to pull the toboggan onto the downhill slope while the rest of the economy with equal effect tries to hold it back.

It is also the considered policy in Canada that the high visibility aspects of metric conversion—weather reports, road signs, postal scales, gasoline pumps and retail food scales—must not be allowed to lag behind in metric conversion. If the consumer in Canada eats his breakfast to a weather report in Celsius, drives 16 km to work at 50 km/h, mails a 200 g parcel, and on the way home buys 45 liters of gasoline, a half kg of butter, a kg of hamburg and 6 liters of milk, metrics will indeed be a part of our daily life in Canada, and industrial conversion will carry on from this point with a natural pick up of momentum on the downhill slope.

Weather reports, road signs and postal scales are relatively easy since they are dependent on government decision. Since April 1, 1975, all weather reports in Canada have been in Celsius, although some private radio stations still also quote Fahrenheit. Road signs will go metric in September 1977. The Post Office plans are not yet finalized, but the postal system will probably go metric in 1977.

It appears that gasoline dispenser conversion will move more rapidly than we had originally thought. The petrloeum industry had

accepted the inevitability of metric conversion and was working toward a completion date of about 1980. The industry is, however, being overtaken by events.

The price of gasoline has been increasing rapidly, largely as a result of the pulls of the international marketplace, but partly also due to a new federal excise tax of 10 cents per gallon, effective June 1975, which is designed to discourage unnecesary use. As a result, the price of premium gasoline in a few remote areas is already over $1.00 per Canadian gallon, equivalent to about 84 cents per U.S. gallon. The computers will, of course, not accept a price greater than 99.9 cents per gallon.

On a strictly interim basis, to avoid very expensive and interim mechanical modifications to the computer sections, we will permit sale by the half gallon with a suitable legend on the computer face. Cut-off dates will be the earliest of: August 1, 1978, if less than 10 percent of all dispensers are affected; 2 years from the date that over 10 percent of all dispensers are affected; and 1 year from the date that over 20 percent of all dispensers are selling at over $1.00 per gallon. Since metric conversion is the logical ultimate solution to the problem—$1.00 per Canadian gallon is the equivalent of 22 cents per liter, well within computer capacity—we will in effect have the retail gasoline industry converted by mid-1978 at the latest and early 1977 at the earliest.

Prepackaged goods in Canada which are factory packed will shortly all bear metric markings, either in conjunction with conventional marking—dual labeling—or exclusively in metric if they are packaged in approved round metric sizes. Beyond September 1, 1975, no nonfood packages, and beyond March 1, 1976, no food packages can be sold which do not bear metric marking. This will be a significant step in consumer education, but by no means conclusive since many consumers seem to buy by eye or by "heft." Metric package marking can help, but will not force, the consumer to "think metric."

The metric conversion of retail food scales is perhaps the most critical and at the same time the most difficult problem in the metric conversion program of any country, and Canada is no exception. Scale conversion—or replacement—costs money, and no retailer really believes he will sell more pork chops by the kilogram.

The Working Group on Scale Conversion in the Retail Food Industry which has members from both the retail food industry and the retail scale industry, has made excellent progress in preparing a detailed plan for metric conversion.

It is planned to set up local-coordinating committees in districts corresponding roughly to the 21 weights and measures districts across the country, each centered on a major city, and within each

district to schedule metric conversion by advertising areas. Within each retail chain, enough new scales of advanced design would be purchased so that there would be "floaters" for changeout. Ideally, and there are of course many reasons why we could fall short of the ideal, a new or converted metric scale would be set up beside each unconverted scale so that over a single weekend, in a given advertising area, there would be a clean changeover to metric. It is planned to convert in three test areas—Sherbrooke, Quebec; Peterborough, Ontario; and Kamloops, British Columbia—beginning January 1978, and begin the general schedule of conversion in July 1978, after the lessons of the "pilot" project have been thoroughly studied.

So much for the plan. A problem which has become increasingly obvious is that while all major retail chains and all major associations are represented in the Working Group, and all have participated effectively, none are as yet financially committed; and all are to a greater or lesser degree concerned about the reactions of the independents who can and probably will go their own independent ways. The major chains are firmly entrenched in most major metropolitan areas and can probably ignore the independents there, but in many areas of Canada independents handle the greater part of the business.

There is some possibility of relief from import duty and sales tax on metric conversion kits, and such relief could be tied to an agreed conversion schedule to provide some degree of encouragement and reward for "all pulling together."

But it becomes increasingly obvious to me, at least, that some system of cut-off dates will ultimately be required to ensure orderly and optimum progress in retail conversion. The Weights and Measures Act now specifically precludes the establishment of cut-off dates for use of the traditional units of measurement. It could be fairly simply modified to permit the establishment by regulations—that is by Cabinet decision—of highly selective cut-off dates after achievement of consensus in the affected segments of industry. These cut-off dates could be applicable to approval, first inspection of a new device, reinspection of an existing device, and finally, sale of commodity in terms of traditional units. Such dates could be set where necessary for particular types of devices, for particular trade categories, and for particular geographic areas. Such a system of cut-off dates could be a whisk broom rather than a bulldozer.

There has to date been some concrete progress on the industrial front. A number of companies are "going metric" on new plants and on new equipment, and at the same time are converting their product lines. Some segments of industry are well advanced with planning and scheduling. The grain industry, for instance, has set February 1, 1977, as the date after which all grain industry transactions will

be in terms of metric tons. In this industry, most new scales are already being installed in metric.

The conversion of scales and meters will obviously have a major impact on the weights and measures inspection service. We had metric conversion very much in mind in the drafting of the new Weights and Measures Act and Regulations which came into effect one year ago. The new Act clearly holds the device owner responsible for maintaining the accuracy of his weighing or measuring equipment; and through him, the service organization can be encouraged to do the job conscientiously and well. Following any significant servicing work, including metric conversion, the organization or person doing the work must report it to the local weights and measures office.

Service organizations are encouraged to apply their own company security seals after they have tested the device, and these seals receive the same protection under the new Act as do the seals of the weights and measures inspectors. Following receipt of the report, the inspection staff can then make spot-check inspections to maintain adequate control.

Under the old Act, many device owners considered the inspection certificate to be a "license to use" and in some manner also a guarantee of continuing accuracy during the life of the certificate. Under the new Act, any device must be inspected before first use, but beyond that point, it can legally continue in use as long as the owner satisfies himself that it continues to be accurate. It may, of course, be sealed against use by the inspector if found on a regular or control inspection to be grossly inaccurate. But the important point here is that the device can be returned to use following metric conversion before it has been inspected, and the inspection staff can maintain control with intelligent selective inspection without becoming a crucial bottleneck in metric conversion.

Any new equipment being ordered for the inspection staff is now metric. We are equipping new weight trucks with 500 kilogram and 20 kilogram weights, and our "bulk" weights are also 20 kilogram. Weight kits are of the rectangular stainless steel bar type in the larger sizes. Weights are in the 1, 2, 2, 5 series, including 14 one kilogram weights, and extend down to 1 gram. Special kits for the product inspectors who look after packaging plant inspections, extend down to 10 milligrams and have only 9 one kilogram weights. As rapidly as possible, each inspector will be equipped with a metric weight kit since using an avoirdupois set for inspecting a metric scale can be very discouraging.

In the larger sizes, an "add-on" weight kit can be quite practical; and this is probably the ideal solution during the period of conversion since industrial scales will be converted on a very hopscotch pattern.

Our heavy duty weight trucks now carry 18 one-thousand pound weights and 3 one-thousand pound baskets, which are interchangeable with the block weights for handling. Each basket has a sealed weight of 200 pounds and contains 16 fifty-pound weights. For the testing of a metric scale, 2 fifty-pound weights are added for each 1,000 pound block weight on the scale. With a very small add-on, again in the 1, 2, 2, 5 series, we have 500 kilograms.

Add-ons for fifty-pound weights to take them up to 25 kilograms do not work out quite as well, but it is still practical for an inspector to carry a kit of add-ons for the 10 fifty-pound weights he carries in the trunk of his car and for a weight truck to carry add-ons to permit testing of intermediate capacity metric scales with a fifty-pound weight.

Similarly, our five-gallon and one-gallon test measures for service station inspection will be replaced with 20-liter and 5-liter sizes, but we will continue to use the old cans for calibration of both gallon and liter gasoline dispensers. A five-gallon can (Canadian) is the equivalent of 22.73 liters. It is a simple matter to drop a 30 milliliter aluminum "dunker," attached to a chain, into the can to change the volume at the zero-error graduation line to 22.7 liters. This effective volume enables the gasoline dispenser to be tested to an even tenth of a liter.

Working the other way from liters to gallons is even more convenient. A new volumetric prover calibrated to 500 liters is only 0.014 percent short of 110 Canadian gallons, a good "round" quantity for testing gallon meters. A conversion of "500 liters equals 132 U.S. gallons," which involves an error of only 0.065 percent, would also be close enough that a dual scale could be used.

The message here is that with a little forethought, the metric conversion of inspection equipment need not be a staggering expense and that replacement of existing equipment can be postponed for a number of years.

And what of the technical problems of device conversion? To deal with liquid meters first, most manufacturers of gasoline dispensers are planning on installing on new and overhauled dispensers a snap-conversion gearbox between the meter and the computer head. It takes up very little vertical space and once a pin or level is actuated at the time of metric conversion, an internal spring holds it into a 4.546-to-1 step-up gearing position. The price register will be reset from, say, 79.9 cents per gallon to 17.6 cents per liter, and the "gallon" legends will be overlaid with self-adhesive "liter" masks. Checks are being run to determine whether the increased gearing drag will be enough to require recalibration.

This snap-conversion gearbox costs only about $25, plus labor, so it may also be used for dispensers which are entirely field converted.

Industrial meters, basically, are converted by interchanging gearing and the register face. But an interesting problem is this: In most cases, step-up gearing would increase the final wheel speed beyond its mechanical limits and step-down gearing will be required. If a gallon meter is converted to read in decaliters, it is pretty straightforward; but if it is converted to read in liters, the decimal place is wrong, the final wheel color is wrong, and the conversion costs about twice as much as for gallons-to-decaliters. The petroleum industry prefers the purist approach of conversion to either liters or, for the largest meters, cubic meters, but after learning of the costs involved they are deferring a decision for several months. I rather think that they will decide that in the long run it would be preferable to avoid introducing a further term, the decaliter, into the system.

A very great number of technical approaches to scale conversion will be required since scales are themselves a very broad category.

As a general comment, metric conversion will probably accelerate the trend to digital electronic readouts, both in complete replacement of scales and also in replacement of beams and dials, particularly unit weight dials, with steelyard load cells and digital readouts.

The escalating price of meats and produce have already outstripped the computing capacity of that old workhorse, the cylinder scale, and many of these will be replaced with digital electronic computing scales. But the working group gave a good deal of thought to the future of the cylinder scale. Not every store can afford to go electronic at present price levels. The recommended approach is to convert all the cylinder scales of a single manufacturer to a single capacity of 10 kilograms and to produce a single chart to minimize tooling costs. This chart would have unit prices in a geometric progression with roughly 4 percent increments from $1.70 to $16.20 per kilogram; and the same figures, by dropping the final zero, would give an effective range from 17 cents to $16.20 per kilogram with no computation. Price splitting with cylinder scales, while admittedly undesirable, is an almost universal practice; and by two-step price splitting, the proposed chart would provide a total of 1,300 unit prices from a chart having only 52 unit price columns.

To sum up, in Canada we believe that careful planning for metric conversion will pay off and that very close attention must be given to retail conversion to ensure that the consumer will come to "think metric" as early in the game as possible. Planning, to be effective, must involve all segements of the economy and when all these heads get together, many good ideas are generated for minimizing the costs and hastening the substantial benefits of metric conversion.

Metric conversion is a very interesting experience and so far in Canada the general climate has been one of acceptance and support. If it were not that I suspect the United States is already ahead of Canada on metric conversion in many significant segments of the economy, I would say, "Come on in! The water is fine!".

DISCUSSION

Mr. D. Montanari (Plymouth, Massachusetts): I would like to ask Mr. Armstrong if he has had any feedback, negative or positive, from the construction industry. How are they going for the metric system? Are they selling lumber by the yard? What effect does it have on the construction industry?

Mr. J. L. Armstrong (Canada): I am afraid I haven't been following this really closely. There is a working group in the construction industry rather parallel to the working group in scales in the retail food industry, and it has been making real progress. But the real details of their decisions, I am not familiar with. For instance, one thing I can tell you is the size of a sheet of plywood would be 1.2 meters by 2.4 meters, and this sort of thing. It will be a rationalized dimensioning system, but I am afraid I really cannot get into details. We could get the information for you if you are interested. I am not an expert.

REPORT OF THE COMMITTEE ON EDUCATION, ADMINISTRATION AND CONSUMER AFFAIRS

Presented by D. I. Offner, *Chairman*, Commissioner of Weights and Measures, Department of Public Safety, City of St. Louis, Missouri

(Thursday, July 17, 1975)

The Committee on Education, Administration, and Consumer Affairs submits its final report to the 60th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement, and as amended by the final report. The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

NATIONAL SURVEY OF WEIGHTS AND MEASURES ADMINISTRATION

The second phase of the national survey on resources and activities has been completed, and a preliminary study of the data reveals the need for additional contact in the form of telephone or written communication in specific areas. The fact that less than 200 responses were received from more than 800 contacted, and in many cases the responses were anonymous, makes the value of the data very questionable. The committee expresses its disappointment in the response to this effort.

A third phase of the survey, covering training activities of the various jurisdictions, has been conducted since the last Conference. This third phase was, in fact, part of an overall study of the NBS training program conducted by Dr. Justin Kim of the Technical Analysis Division with considerable assistance from Mr. Henry Oppermann of Wisconsin, who participated in our program under the Intergovernmental Personnel Act. During a lengthy discussion of the survey with Dr. Kim at the interim meeting, it became apparent that certain areas of training and qualifications of weights and measures personnel are in need of attention. Among the problem areas is the contrast evident between the level and uniformity of

training of metrologists throughout the country, and the lack of uniformity in the level of training of field personnel. Another such problem area is the desperate need for funding any adequate training program.

FUNDING FOR METRIC EDUCATION

The committee is advised that Public Law 93–380, known as the Education Amendments Act of 1974, authorized the expenditure of $10,000,000 per year over a four-year period to support establishment of programs in metric education. Though this authorization of expenditures has not as yet been funded, the committee has been advised that an early appropriation of such funds is possible. It is the recommendation of the committee that as soon as such funding becomes available, the executive secretary of this Conference should file an application for a grant to be expended by the Conference in development of a metric educational program.

The committee is pleased to report that contact has been made with Dr. Floyd A. Davis, Project Manager, Metric Education Program, U.S. Office of Education, ROB 3, Room 3043, Washington, D.C. 20202, in regard to this item. Dr. Davis is receptive to the idea of a plan of metric education for weights and measures officials and is in attendance at this Conference primarily for the purpose of meeting with the committee in implementation of a satisfactory plan.

Mr. John Landvater of Landvater Associates has offered the services of his firm in developing the details of a metric education grant to accomplish systematic training for weights and measures officials. Mr. Landvater is also present at this Conference and has met the committee to discuss the details of his firm's services.

The committee would like to express its appreciation to Dr. Davis and Mr. Landvater for their presentations at the committee's open session. The committee is delighted at the prospect of working with Dr. Davis and Mr. Landvater in this very important program.

STANDARDIZING THE SPELLING OF "METRE" AND "LITRE"

The committee recommends that appropriate action be taken to make uniform throughout the nation the spelling "metre" and "litre." The committee feels that consideration should be given to accomplishing this through promulgation in the Federal Register by the director of the National Bureau of Standards, thus formalizing the position advocated by the director in the recently issued LC 1056, "NBS Guidelines for Use of the Metric System."

TECH MEMOS

The committee is happy to report that since the resumption of publication of the Tech Memo, three memos have been issued and distributed. These are Tech Memos 25, 26, and 27. Publication will continue on a quarterly basis or more often if necessary. The committee has long recognized that the Tech Memo has tremendous potential, both as a training medium and an information source. The committee sees this as a valuable vehicle for the dissemination of information about work of the National Bureau of Standards and for the various weights and measures officials to inform others of methods and techniques which they have developed. The success of the Tech Memo will, however, require input from the various weights and measures jurisdictions. Officials should send their contributions to Mr. R. N. Smith at the Office of Weights and Measures. The committee strongly endorses this action by OWM and urges weights and measures officials to cooperate by making proper use of this information dissemination vehicle.

EXAMINATION PROCEDURE OUTLINES (EPO'S)

The committee recommends that the Committee on Specifications and Tolerances develop Examination Procedure Outlines (EPO's) for devices for which no EPO's presently exist. Among the devices for which EPO's are presently needed are railroad track scales and a whole range of timing devices. The committee recommends that in the development of EPO's consideration be given to augmenting the citation of reference sections by including the title of the section and the page number in addition to the section number.

The committee is aware of a feeling that there may be a legal problem resulting from the incorporation of the EPO's into a separate handbook. It may be necessary in some jurisdictions to go through legislative adoption of this new handbook to give it necessary legal status.

NATIONAL CONFERENCE PROGRAM PLANNING

The committee's mission has been expanded to include assistance to the executive secretary in developing programs for future Conferences. The committee welcomes the opportunity to have input in planning future programs and encourages Conference members to forward ideas which they may have for future consideration.

In connection with our new responsibility, the committee met with Mr. Robert Walleigh, former NBS Associate Director for Administration, who is presently involved in planning both the NBS 75th

anniversary celebration and the NBS involvement in the bicentennial celebration in 1976. Mr. Walleigh extended an invitation to the Conference to hold at least one session at the National Bureau of Standards, including a tour of NBS facilities and exhibits.

The committee would like to explore the possibility of setting up exhibits of historical weights and measures artifacts which many jurisdictions may have. The exhibit would be at NBS during 1976. The committee would like some indication of interest on the part of jurisdictions in participating in this project.

Ideas for program items and format for future Conferences, starting with 1975, should be communicated to the committee through R. N. Smith, staff assistant, at the Office of Weights and Measures.

NATIONAL WEIGHTS AND MEASURES WEEK

The committee wishes to thank its member, W. B. (Red) Harper, who served as chairman of National Weights and Measures Week, for an outstanding job in promoting the Week. Mr. Harper deeply appreciated the 32 State directors who cooperated with him by appointing a State coordinator; he was disappointed, however, in the fact that 18 State directors failed, for whatever reason, to respond. Special thanks are also extended to the Scale Manufacturers Association, the Scale Journal, and Toledo Scale Company for their cooperation and help in promoting the Week.

The committee is pleased to report that response for weights and measures week activities to be made a part of the state and local weights and measures activity summary has been good. Conference delegates are urged to retain their copies of the activity summary for future information and use.

SMITHSONIAN INSTITUTION EXHIBIT OF WEIGHTS AND MEASURES

The committee has been informed by Dr. Jon Eklund that necessary time and funding for the original project is not available. However, the Smithsonian is presently putting together a large bicentennial exhibit titled "We the People" that will include weights and measures historical artifacts and information. The exhibit will be semipermanent in nature and will appear in three parts: "Of the People," "By the People," and "For the People." The exhibit will open in April 1975; and it is expected that it will be visited by 12 to 16 million people in 1976. It is planned to keep the exhibit available to visitors for a ten-year period. Weights and measures officials should plan to visit this exhibit while attending the Conference in 1976.

WEIGHTS AND MEASURES PROMOTIONAL ACTIVITIES

1. Weights and Measures Commemorative Stamp

The committee has no new information to report on the commemorative stamp. Efforts are still being made, notably by Mack Rapp, on this subject. The committee recommends that the good offices of the Secretary of Commerce be sought in obtaining a weights and measures commemorative stamp.

2. Weights and Measures Commemorative Medallion

A final order of medallions was received in June of this year. Response to this project has been outstanding and orders are continuing to be received. The committee urges all who are interested in receiving medallions to order as soon as possible. The project will continue as long as the supply lasts. Orders should be directed to:

R. N. Smith
Office of Weights and Measures
National Bureau of Standards
Washington, D.C. 20234

3. Scouts of America Weights and Measures Merit Badge

The committee has been informed by the National Scout Organization that, due to circumstances beyond its control, it is necessary that the inauguration of new merit badges be suspended for a time. We have been assured that this item can be brought up for action at a later date.

The Scout Organization appreciates the interest and work that Conference members have put forth on this project. The committee wishes to express its appreciation to the Conference members for their interest and support of this project. The committee will renew our request for a merit badge at the earliest opportunity.

NATIONAL CONFERENCE SELF-ADHESIVE DECALS

The committee was pleased to supply each registrant at this Conference with two National Conference decals. This was done in partial response to the many requests that have been received for these decals since the 50th Anniversary National Conference.

In further response to requests received, the committee is happy to announce the availability of these decals for purchase by weights and measures and industry officials. In order to minmize the problem of order taking and handling of finances, it is necessary to offer these on a minimum order basis of $5. Since a sizable order was placed with the company manufacturing these decals, considerable

savings can be passed on to those wishing to purchase the decals. The minimum order of $5 will purchase 30 decals. Forty-five decals can be offered for $7.50; 60 for $10; 75 for $12.50; or 100 for $15; and at the rate of $15 per hundred for larger orders. Checks should be made payable to the National Conference on Weights and Measures and orders should be directed to:

R. N. Smith
Office of Weights and Measures
National Bureau of Standards

An order form is included as part of this report.

WEIGHTS AND MEASURES—INDUSTRY INFORMATION PROGRAM

The committee is very pleased to note that Scale Manufacturers Association President Charles W. Silver has announced a new program of information exchange between SMA members and weights and measures officials. The program will make status reports, new standards, position reports, and other SMA material available to weights and measures officials by direct mail.

In return, SMA will ask that the weights and measures community send copies of information of interest and concern to the weighing industry to the SMA office (at the following address) for distribution:

Scale Manufacturers Association
1000 Vermont Avenue, N.W.
Washington, D.C. 20005

The committee wholeheartedly endorses and supports this program and urges weights and measures officials to cooperate.

ORDER FORM
FOR
WEIGHTS AND MEASURES MEDALLION

Please enter my order for:

_____	Sterling Silver Weights and Measures Medallion	$15.00 each
_____	Bronze Weights and Measures Medallion	7.50 each
_____	Presentation Case for Weights and Measures Medallion	2.50 each

Total amount enclosed: $_____

Make check or money order payable to:

National Conference on Weights and Measures

Name _____

Address _____

_____

Mail order to:

R. N. Smith
Office of Weights and Measures
National Bureau of Standards
Washington, D.C. 20234

ORDER FORM
FOR
NATIONAL CONFERENCE DECALS

Please enter my order for:

_____ 30 Decals	$ 5.00
_____ 45 Decals	7.50
_____ 60 Decals	10.00
_____ 75 Decals	12.50
_____ 100 Decals	15.00
_____ at $15 per 100 Decals	

Total amount enclosed: $_____

(Minimum Order $5.00)

Make check or money order payable to:

National Conference on Weights and Measures

Name _____

Address _____

_____

Mail order to:

R. N. Smith
Office of Weights and Measures
National Bureau of Standards
Washington, D.C. 20234

D. I. Offner, *Chairman*, St. Louis, Missouri
W. B. Harper, Birmingham, Alabama
W. H. Korth, Ventura County, California
S. Valtri, Philadelphia, Pennsylvania
R. T. Williams, Texas
R. N. Smith, *Staff Assistant*, NBS
H. F. Wollin, *Exec. Secy.*, NCWM

Committee on Education, Administration, and Consumer Affairs

(Mr. Offner moved for adoption and, after a second from the floor, the report of the Committee on Education, Administration, and Consumer Affairs was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON LAWS AND REGULATIONS

Presented by R. L. Thompson, *Chairman*,
Chief, Weights and Measures Section, Department of Agriculture,
State of Maryland

(Thursday, July 17, 1975)

The Committee on Laws and Regulations submits its final report to the 60th National Conference on Weights and Measures. The Report consists of the tentative report as offered in the Conference Announcement and as amended by the final report.

The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

MODEL STATE WEIGHTS AND MEASURES LAW

1. Noise Measurement Standards

The Western States Weights and Measures Association concluded that there is a consensus of opinion that weights and measures jurisdictions should be expanded to provide authority to establish technical requirements for noise measurement devices. The committee agrees and feels that this is only one element of an ever expanding set of responsibilities. The current Model Law appears to limit activities to commercial devices, which is too restrictive. The committee recommends that Section 4. should, therefore, be revised as follows:

SECTION 4. TECHNICAL REQUIREMENTS FOR WEIGHING AND MEASURING DEVICES.—The specifications, tolerances, and other technical requirements for commercial, law enforcement, data gathering, and other weighing and measuring devices as adopted by the National Conference on Weights and Measures and published in National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices," and supplements thereto or revisions thereof, shall apply to weighing and measuring devices in the state, except insofar as modified or rejected by regulation.

(The foregoing item was adopted by voice vote.)

2. Weighing Practices in Service Related Industries, Based on Estimates

The County of Ventura, California, expressed concern about Amtrak's practice of representing baggage charges based on estimated

weights. Similar problems were identified in other service related industries including laundries. The committee feels that the law should be as explicit for services as it is for products and recommends that Section 8. be revised as follows:

SECTION 8. MISREPRESENTATION OF QUANTITY.—No person shall sell, offer, or expose for sale less than the quantity of commodity or service he represents, nor take any more than the quantity of commodity or service he represents when he furnishes the weight or measure by means of which the quantity is determined.

(The foregoing item was adopted by voice vote.)

3. Time as an Enforceable Quantity Declaration

The enforceability of quantity declarations using time as the basis of measurement for commodities, including packaged commodities, must be considered carefully if equity in the marketplace is to be achieved. The committee wishes to stress to those who have submitted time declaration questions that the enforceability factor should not override consumer protection and uniformity considerations. Based on the above criteria, the committee recommends that the Conference take the position that time is not an appropriate quantity declaration for fireplace logs. The committee further recommends that the States follow FTC guidelines in requiring lineal measure for the sale of movie films and permit either lineal measure or playing time for magnetic tapes and cassettes.

(The foregoing item was adopted by voice vote.)

4. Representation of Price in Submultiple Units of Weight

The Committee on Specifications and Tolerances, concerned about computing scales which represent prices per ½ pound and per ¼ pound, asked that a review be made of the "delicatessen practice" of declaring price in submultiple units of weights as a possible violation of Section 9. Under this provision: "No person shall . . . represent the price in any manner calculated or tending to mislead or in any way deceive a person."

The Committee on Laws and Regulations does not perceive itself as the proper forum for those seeking an advisory opinion as to the legality of this trade practice.

(The foregoing item was adopted by voice vote.)

MODEL STATE METHOD OF SALE OF COMMODITIES REGULATION

1. Precooked Stuffed Poultry Products

A variety of methods of sale of precooked stuffed poultry products has been recognized by the State of Virginia and others. It is sug-

gested that a uniform method be established so that sellers, where possible, will represent the quantity of these items in a like manner. The committee, therefore, recommends consideration and adoption of the following revised addition:

SECTION 5. MEAT, POULTRY, AND SEAFOOD.—In the case of precooked products where weight is declared or precooked stuffed products, the label must show the total net weight of the product at the time of sale.

(After lengthy discussion, the foregoing item was defeated by a standing vote.)

2. Three Quart Package for Fluid Milk

The International Paper Company proposed again this year that a three quart milk container be included as an allowable size under Section 6. Last year they indicated that the three quart container would yield significant savings in scarce materials, such as paperboard and plastic coatings. They now allege that this size is permitted in approximately 20 States and the dairies that have sold the three quart have replaced more expensive packaging methods and have passed some of the savings along to the consumer. For the above reasons, the committee recommends that Section 6. be revised as follows:

SECTION 6. FLUID MILK PRODUCTS.—All fluid milk products, including but not limited to milk, lowfat milk, skim milk, cultured milks and cream shall be packaged for retail sale only in units of 1 gill, ½ liquid pint, 10 fluid ounces, 1 liquid pint, 1 liquid quart, ½ gallon, 3 liquid quarts, 1 gallon, 1½ gallons, 2 gallons, 2½ gallons, or multiples of 1 gallon: Provided, that packages in units of less than 1 gill shall be permitted.

(After lengthy discussion, the foregoing item was defeated by a standing vote.)

3. Proliferation of Cottage Cheese Sizes

Two regional weights and measures associations recommended that cottage cheese packaged for retail sale should be limited to a rational set of allowable sizes. The Milk Industry Foundation surveyed the situation and in their report indicated that they did not find undue proliferation of packaged cottage cheese quantities. The Foundation also stated that a variety of small sizes is essential to meet current market demand. The committee determined that a rational set of sizes should be established.

Because low fat and dry curd cottage cheese products generally differ in density from cottage cheese, and therefore may require standard packages which are slightly larger, the committee now recommends that Section 7. be revised as follows:

SECTION 7. OTHER MILK PRODUCTS.—Cottage cheese, cottage cheese products, and other milk products which are solid, semisolid, viscous, or a

mixture of solid and liquid, as defined in the Pasteurized Milk Ordinance of the U.S. Public Health Service, as amended in 1965, shall be sold in terms of weight: Provided, That cottage cheese, cottage cheese products, sour cream, and yogurt shall be packaged for retail sale only in units of 8, 12, 16, 24, 32, 64, 80, and 128 ounces avoirdupois; and further Provided, That multipack or single serving sizes of 6 ounces or less shall be sold only in even ounce increments.

Note: Standard package sizes shall apply to low fat and dry curd cottage cheese products as of July 1, 1976.

(The foregoing item was adopted by voice vote.)

4. Peat and Peat Moss

In order to increase productivity and reduce distribution costs in the peat industry, Peat Institute members have standardized on a 40 pound size. They have, therefore, requested that this unit be added to the set of allowable sizes. Additionally, they agreed to support an amendment for a rationalized set, which would eliminate three sizes currently allowed. The committee, therefore, recommends for consideration and adoption the following revision:

11.2.1. Weight.—Peat and peat moss sold in terms of weight shall be offered and exposed for sale only in units of 50 pounds, 40 pounds, 20 pounds, 10 pounds, or 3 pounds.

(The foregoing item was adopted by voice vote.)

5. Combination Quantity Declarations

This year the committee continued discussions with appropriate trade associations to define allowable differences for combination quantity commodities. Based on these discussions the committee recommends consideration and adoption of the following amendments and appropriate renumbering of existing provisions:

16.2. Glassware.—Large Blown Pitchers and Apothecaries.—The allowable difference between actual and declared capacity shall be plus 6.25 percent or minus 5 percent of the stated capacity for items over 6 ounce capacity.

16.3. Glassware.—Large Pressed Bowls, Mixing or Casserole; Loaf Pans; Utility Dishes; and Roasters.—The allowable difference between actual and declared capacity shall be plus 6.25 percent or minus 5 percent of the stated capacity for items over 6 ounce capacity.

16.4. Glassware.—Small Blown and Pressed Bowls, Blenders, Pitchers, Sherbets, Desserts, Soups, Cups and Mugs.—The allowable difference between actual and declared capacity shall be:

(a) Plus or minus ⅜ ounce for items of 6 ounce capacity or less;
(b) Plus 6.25 percent or minus 5 percent of the stated capacity for items over 6 ounce capacity.

16.5. Paper and Plastic Cups.—The allowable difference between actual and declared capacity shall be:

(a) Plus or minus ¼ ounce for items of 5 ounce capacity or less;
(b) Plus or minus 5 percent of the stated capacity for items over 5 ounce capacity.

(A motion to table the foregoing item until next year was adopted by voice vote.)

6. Fireplace and Stove Wood

The Southern Weights and Measures Association recommended that a new section be added to establish a method of sale for fireplace and stove wood. Additionally, others have questioned the current practice of selling processed wood by time measure, which several companies are doing and/or by weight, which the Federal Trade Commission prefers. The committee, after careful deliberation, feels that the consumer will be better able to make value comparisons if all fireplace and stove wood is sold by cubic measure. The committee, therefore, recommends consideration and adoption of the following new section:

SECTION 18. FIREPLACE AND STOVE WOOD.—For the purpose of this regulation, this section shall apply to the sale of all wood, natural and processed, for use as fuel.

18.1. Definitions.

18.1.1. Fireplace and Stove Wood.—Any kindling, logs, boards, timbers or other wood, split or not split, advertised, offered for sale or sold as fuel.

18.1.2. Cord.—The amount of wood which is contained in a space of 128 cubic feet, when the wood is ranked and well stowed. For the purpose of this regulation, "ranked and well stowed" shall be construed to mean when pieces of wood are placed in a line or row, with individual pieces touching and parallel to each other, and stacked in a compact manner.

18.1.3. Representation.—A "representation" shall be construed to mean any advertisement, offering, invoice, or the like that pertains to the sale of fireplace or stove wood.

18.2. Identity.—A representation may include a declaration of identity that indicates the species group (Example: 50% hickory, 50% miscellaneous softwood). Such a representation shall indicate, within ten percent accuracy, the percentages of each group.

18.3. Quantity.—Wood, of any type, for use as fuel will be advertised, offered for sale and sold only by measure, using the term "cord" and fractional parts of a cord; except that wood, natural or processed, offered for sale in packaged form will display the quantity in terms of cubic feet, to include fractions of cubic feet.

18.4. Prohibition of Terms.—The term "face cord," "rack," "pile," "truckload," or terms of similar import shall not be used when advertising, offering for sale, or selling wood for use as fuel.

18.5. Delivery Ticket or Sales Invoice.—A delivery ticket or invoice will be presented by the seller to the purchaser whenever any nonpackaged fireplace or stove wood is sold. The delivery ticket or sales invoice will contain at least the following information:

(a) The name and address of the vendor
(b) The name and address of the purchaser

(c) The date delivered
(d) The quantity delivered and the quantity upon which the price is based, if this differs from the delivered quantity
(e) The price of the amount delivered
(f) The identity of the most descriptive terms commercially practicable, including any quality representation made in connection with the sale

(The foregoing item was adopted by voice vote.)

7. Prefabricated Utility Buildings

The Southern Weights and Measures Association requested that the Conference establish a uniform method of sale for utility buildings. The committee concluded that the practice of offering for sale garden type and other prefabricated utility buildings on the basis of nominal sizes tends to mislead consumers. Industry representatives argued that the use of nominal sizes has become a standard trade practice which is wholly acceptable to retailers. They also indicated that requiring industry to declare accurate outside dimensions including roof overhang would be a hardship and of little or no value to consumers. The committee, therefore, recommends for consideration and adoption the following new section:

SECTION 19. PREFABRICATED UTILITY BUILDINGS.—These buildings shall be offered for retail sale on the basis of usable inside space as follows:

(a) Length, measured from inside surface of wall panels at the base;
(b) Width, measured from inside surface of wall panels at the base;
(c) Height, measured from the base to the top of the shortest wall panel.

Note 1. Inside dimension shall be declared to the nearest inch.
Note 2. If total usable inside space is declared in a supplemental declaration it shall be to the nearest cubic foot.

(The foregoing item was adopted by voice vote.)

MODEL STATE PACKAGING AND LABELING REGULATION

1. Metrication

In keeping with the Conference's advocacy position in favor of metrication, the Committee on Laws and Regulations is actively pursuing the task of modifying the model state regulations to make them fully compatible with the modernized metric system. The Model State Packaging and Labeling Regulation was selected as the first model to be revised. The committee wishes to stress that its intent is to provide guidelines for uniform metric labeling of packages not subject to the Fair Packaging and Labeling Act or whenever packagers choose to use metric labeling, but in no case should any revised section be construed as requiring information different from the requirements of the Act. Last year a new section was added to provide for the uniform use of metric symbols. This year the committee has

revised Section 6. DECLARATION OF QUANTITY: CONSUMER PACKAGES to remove barriers to metrication at the state and local levels and to prescribe the units to be used on metric packages. The committee, therefore, recommends for consideration and adoption the following new Section 6.:

SECTION 6. DECLARATION OF QUANTITY: CONSUMER PACKAGES

6.1. General—Units of the customary system of weights and measures and units of the metric system of weights and measures are jointly recognized, and units of either one of these systems may be used in a declaration of quantity. Additionally, units of both systems may be combined in a declaration of quantity or listed in separate declarations of quantity. Nothing contained in this Section shall be construed to supersede any labeling requirement specified in Federal law.

6.1.1. Customary Units.—A declaration of quantity

(a) in units of weight shall be in terms of the avoirdupois pound or ounce;

(b) in units of liquid measure shall be in terms of the United States gallon of 231 cubic inches or liquid-quart, liquid-pint, or fluid-ounce subdivisions of the gallon, and shall express the volume at 68 ° F (20 ° C), except in the case of petroleum products, for which the declaration shall express the volume at 60 ° F (15.6 ° C), and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at

the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 40 ° F (4 ° C);

(c) in units of linear measure shall be in terms of the yard, foot, or inch;

(d) in units of area measure shall be in terms of the square yard, square foot, or square inch;

(e) in units of dry measure shall be in terms of the United States bushel of 2,150.42 cubic inches, or peck, dry-quart, and dry-pint subdivisions of the bushel;

(f) in units of cubic measure shall be in terms of the cubic yard, cubic foot, or cubic inch.

6.1.2. Abbreviations.—Any of the following abbreviations for customary units, and none other, may be employed in the quantity statement on a package of commodity:

avoirdupois	avdp	ounce	oz
cubic	cu	pint	pt
feet or foot	ft	pound	lb
fluid	fl	quart	qt
gallon	gal	square	sq
inch	in	weight	wt
liquid	liq	yard	yd

(There normally are no periods following, nor plural forms of, these abbreviations. For example, "oz" is the abbreviation for both "ounce" and "ounces.")

6.1.3. Metric Units.—A declaration of quantity

(a) in units of mass (weight) shall be in terms of the kilogram, gram, or milligram;

(b) in units of liquid measure shall be in terms of the liter or milliliter;

(c) in units of linear measure shall be in terms of the meter, centimeter, or millimeter;

(d) in units of area measure shall be in terms of the square meter or square centimeter;

(e) in units of cubic or dry measure shall be in terms of the cubic meter or cubic centimeter.

6.1.4. Symbols.—Any of the following metric symbols may be employed in the quantity statement on a package of commodity:

kilogram	kg	centimeter	cm
gram	g	millimeter	mm
milligram	mg	square meter	m^2
liter	l	square centimeter	cm^2
milliliter	ml	cubic meter	m^3
meter	m	cubic centimeter	cm^3

(Symbols are not capitalized unless the unit is derived from a proper name. Periods should not be used after the symbol. Symbols are always written in the singular form—do not add "s" to express the plural when the symbol is used.)

6.2. Largest Whole Unit.—Where this regulation requires that the quantity declaration be in terms of the largest whole unit, the declaration shall,

with respect to a particular package, be in terms of the largest whole unit of weight or measure, with any remainder expressed in

(a) common or decimal fractions of such largest whole unit; or
(b) the next smaller whole unit, or units, with any further remainder in terms of common or decimal fractions of the smallest unit present in the quantity declaration.

6.3. Net Quantity.—A declaration of net quantity of the commodity in the package, exclusive of wrappers and any other material packed with such commodity, shall appear on the principal display panel of a consumer package and, unless otherwise specified in this regulation (see subsections 6.6. through 6.6.8.) shall be in terms of the largest whole unit.

6.3.1. Use of "Net Weight."—The term "net weight" shall be used in conjunction with the declaration of quantity in terms of weight; the term may either precede or follow the declaration of weight.

6.3.2. Lines of Print or Type.—A declaration of quantity may appear on one or more lines of print or type.

6.4. Terms: Weight, Liquid Measure, or Count.—The declaration of the quantity of a particular commodity shall be expressed in terms of liquid measure if the commodity is liquid, or in terms of weight if the commodity is solid, semisolid, viscous, or a mixture of solid and liquid, or in terms of numerical count. However, if there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such declaration of quantity may be expressed in its traditional terms, if such traditional declaration gives accurate and adequate information as to the quantity of the commodity.

6.4.1. Combination Declaration.

(a) A declaration of quantity in terms of weight shall be combined with appropriate declarations of the measure, count, and size of the individual units unless a declaration of weight alone is fully informative.
(b) A declaration of quantity in terms of measure shall be combined with appropriate declarations of the weight, count, and size of the individual units unless a declaration of measure alone is fully informative.
(c) A declaration of quantity in terms of count shall be combined with appropriate declarations of the weight, measure, and size of the individual units unless a declaration of count alone is fully informative.

6.5. Units with Two or More Meanings.—When the term "ounce" is employed in a declaration of liquid quantity, the declaration shall identify the particular meaning of the term by the use of the term "fluid"; however, such distinction may be omitted when, by association of terms (for example, as in "1 pint 4 ounces"), the proper meaning is obvious. Whenever the declaration of quantity is in terms of the dry pint or dry quart, the declaration shall include the word "dry."

6.6. Prescribed Units.

6.6.1. Less than One Foot, One Square Foot, One Pound, or One Pint.—The declaration of quantity shall be expressed in terms of

(a) in the case of length measure of less than one foot, inches and fractions of inches;
(b) in the case of area measure of less than one square foot, square inches and fractions of square inches;
(c) in the case of weight of less than one pound, ounces and fractions of ounces;
(d) in the case of fluid measure of less than one pint, ounces and fractions of ounces;

Provided, That the quantity declaration appearing on a random package may be expressed in terms of decimal fractions of the largest appropriate unit, the fraction being carried out to not more than two decimal places.

6.6.2. Four Feet, Four Square Feet, Four Pounds, One Gallon, or More.—In the case of

(a) length measure of four feet or more

the declaration of quantity shall be expressed in terms of feet, followed in parentheses by a declaration of yards and common or decimal fractions of the yard, or in terms of feet followed in parentheses by a declaration of yards with any remainder in terms of feet and inches. In the case of

(b) area measure of four square feet or more;
(c) weight of four pounds or more;
(d) fluid measure of one gallon or more

the declaration of quantity shall be expressed in terms of the largest whole unit.

6.6.3. Weight: Dual Quantity Declaration.—On packages containing one pound or more but less than four pounds, the declaration shall be expressed in ounces and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit: provided, That the quantity declaration appearing on a random package may be expressed in terms of pounds and decimal fractions of the pound carried out to not more than two decimal places.

6.6.4. Fluid Measure: Dual Quantity Declaration.—On packages containing one pint or more but less than one gallon, the declaration shall be expressed in ounces and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.6.5. Length Measure: Dual Quantity Declaration.—On packages containing one foot but less than four feet, the declaration shall be expressed in inches and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.6.6. Area Measure: Dual Quantity Declaration.—On packages containing one square foot but less than four square feet, the declaration shall be expressed in square inches and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.6.7. Bidimensional Commodities.—For bidimensional commodities (including roll-type commodities) the quantity declaration shall be expressed,

(a) if less than one square foot, in terms of linear inches and fractions of linear inches;
(b) if at least one square foot but less than four square feet, in terms of square inches followed in parentheses by a declaration of both

the length and width, each being in terms of the largest whole unit: Provided, That

(1) no square inch declaration is required for a bidimensional commodity of four inches width or less,
(2) a dimension of less than two feet may be stated in inches within the parenthetical, and
(3) commodities consisting of usable individual units (except roll-type commodities with individual usable units created by perforations, for which see Subsection 6.6.8. Count: Ply) require a declaration of unit area but not a declaration of total area of all such units;

(c) if four square feet or more, in terms of square feet followed in parentheses by a declaration of the length and width in terms of the largest whole unit: Provided, That

(1) no declaration in square feet is required for a bidimensional commodity with a width of four inches or less,
(2) bidimensional commodities, with a width of 4 inches or less, shall have the length expressed in inches followed by a statement in parentheses of the length in the largest whole unit [Example: 2 inches by 360 inches (10 yards)],
(3) a dimension of less than two feet may be stated in inches within the parenthetical, and
(4) no declaration in square feet is required for commodities for which the length and width measurements are critical in terms of end use (such as tablecloths or bedsheets) if such commodities clearly present the length and width measurements on the label.

6.6.8. Count: Ply.—If the commodity is in individually usable units of one or more components or ply, the quantity declaration shall, in addition to complying with other applicable quantity declaration requirements of this regulation, include the number of ply and the total number of usable units.

Roll-type commodities, when perforated so as to identify individual usable units, shall not be deemed to be made up of usable units; however, such roll-type commodities shall be labeled in terms of

(a) total area measurement,
(b) number of ply,
(c) count of usable units, and
(d) dimensions of a single usable unit.

6.7. Fractions

6.7.1. Customary System Fractions.—A statement of net quantity of contents of any consumer commodity may contain common or decimal fractions. A common fraction shall be in terms of halves, quarters, eighths, sixteenths, or thirty-seconds, except that

(a) if there exists a firmly established general consumer usage and trade custom of employing different common fractions in the net quantity declaration of a particular commodity, they may be employed, and

(b) if linear measurements are required in terms of yards or feet, common fractions may be in terms of thirds.

A common fraction shall be reduced to its lowest terms; a decimal fraction shall not be carried out to more than two places.

6.8. Supplementary Quantity Declarations.—The required quantity declaration may be supplemented by one or more declarations of weight, measure, or count, such declaration appearing other than on a principal display panel. Such supplemental statement of quantity of contents shall not include any terms qualifying a unit of weight, measure, or count that tends to exaggerate the amount of commodity contained in the package (e.g., "giant" quart, "full" gallon, "when packed," "minimum," or words of similar import).

6.9. Qualification of Declaration Prohibited.—In no case shall any declaration of quantity be qualified by the addition of the words "when packed," "minimum," or "not less than," or any words of similar import, nor shall any unit of weight, measure, or count be qualified by any term (such as "jumbo," "giant," "full," or the like) that tends to exaggerate the amount of commodity.

(A motion to table the foregoing item until next year was adopted by voice vote.)

2. Location of Quantity Declaration on Cylindrical Containers

A representative of the paint industry indicated that a reading of Section 8.1.1. in conjunction with Section 10.7. raised an ambiguity as to whether quantity declaration on cylindical containers were required to appear in the bottom 30 percent of the principal display panel. When informed that Section 10.7. was an additional requirement, the industry representative suggested that it would be helpful to packagers if the ambiguity is removed. The committee agrees and, therefore, recommends consideration and adoption of the following amendment:

8.1.1. Location.—The declaration or declarations of quantity of the contents of a package shall appear in the bottom 30 percent of the principal display panel or panels. For cylindrical containers, see also subsection 10.7. for additional requirements.

(The foregoing item was adopted by voice vote.)

3. Gift Packages Offered for Sale With No Weight Declarations

The State of Colorado expressed concern about the selling of gift packages of products with no weights or estimated weight. This problem was described as serious and one that seems to be nationwide. The committee agrees and hereby requests that this matter be referred to the Resolutions Committee for appropriate action.

(The foregoing item was adopted by voice vote.)

4. Packaged Seed

The Association of American Seed Control Officials determined last year that they should strive to achieve a revision to Section 10.10. Packaged Seed so that small packages of seeds would be sold by count rather than metric weight. An *ad hoc* Committee was formed to define and resolve this issue. The findings of the *ad hoc* Committee are as follows:

- A quantity declaration by count would be, per se, of more value to consumers than a quantity declaration by metric weight.
- The improper and nonuniform use of metric symbols on seed packages causes considerable confusion as consumers learn to use the metric system.
- A declaration by weight, generally, enables consumers to obtain sufficiently accurate information as to the quantity of the contents of a package and facilitates value comparisons.
- There would be additional cost to consumers, should NCWM require the seed industry to provide accurate enforceable count declarations.

Based on the above findings, it is the opinion of the Laws and Regulations Committee that the costs that consumers would have to pay to obtain accurate enforceable statements of count for small packages of many types of seeds would exceed the benefits. The committee also believes that consumer problems associated with learning to use the metric system will be alleviated by the committee's efforts to achieve metric uniformity and will pass with time. Additionally, however, the committee believes that the seed packaging industry should provide on each package, on a voluntary basis, more consumer information such as the percentage of germination as required by seed laws and an estimate of the required planting area for a given package of seeds. Finally, the committee believes that with certain specialized methods of preparing and packaging seed, an accurate enforceable statement of count is readily determinable and should be required. The committee, therefore, recommends for consideration and adoption the following revision to Section 10.10. Packaged Seed:

(c) The quantity statement for coated seed, pelletized seed, encapsulated seed, seed tapes, pre-planters, etc., shall be in terms of count.

(The foregoing item was adopted by voice vote.)

5. Serving-Size Packages

Several weights and measures officials called to the attention of the committee an apparent discrepancy between a USDA regulation and the Model State Packaging and Labeling Regulation.

USDA regulation (9 CFR § 317.2 (9(i)) states: "Individually wrapped and labeled packages of less than ½–ounce net weight which are in a shipping container, need not bear a statement of net quantity of contents when the statement of net quantity of contents on the shipping container meets the requirements of this paragraph . . ." The model regulation Section 11.4. provides that: "Individual–serving–size packages of foods containing less than ½ ounce . . . and not intended for sale at retail, shall be exempt from the required declaration of net quantity of contents . . ."

The committee is of the opinion that whenever these packages are sold at retail a declaration of net quantity of contents should be required and State and local weights and measures officials should take appropriate action. The committee, therefore, recommends no change to Section 11.4.

(The foregoing item was adopted by voice vote.)

6. Variations Resulting from Exposure

The National Bureau of Standard's Technical Consultant on the revision of Handbook 67 raised the issue of striking Section 12.1.2. because of its unenforceable wording and to follow the USDA position of disallowing references in its regulations to "reasonable variations caused by gain or loss of moisture."

After careful deliberation, the committee looked with some favor upon the deletion of Section 12.1.2. Nevertheless, the committee believes that action at this time might be premature because of pending litigation which could determine a course of action with requirements not contemplated by the committee. The committee has not, however, ruled out the possibility that it will be able to make a recommendation to the Conference in the future and hereby reaffirms the position taken by the Conference in its response of March 29, 1974, to the U.S. Department of Agriculture concerning their proposed rule on net weight labeling.

(The foregoing item was adopted by voice vote.)

7. Incorporate by Reference FTC Regulations

Representatives of the Toy Manufacturers of America respectfully requested that the National Conference on Weights and Measures adopt an amendment to the Model State Packaging and Labeling Regulation which would incorporate by reference all regulations, statements of general policy or interpretations issued by the Federal Trade Commission under the Fair Packaging and Labeling Act.

While the committee believes that uniformity of regulations is an important objective it is of the opinion that protection of the purchasers and sellers within individual States is an overriding con-

sideration and should not be left solely in the hands of Federal rule makers. The committee, therefore, recommends against adopting any such amendments.

(The foregoing item was adopted by voice vote.)

8. Individually Wrapped Pieces of Confectionary

After the interim report was issued, the Food and Drug Administration (FDA) proposed to exempt individually wrapped pieces of confectionary of not more than 2 ounces from the requirement for net quantity of contents declaration. On behalf of the Conference, the Laws and Regulations Committee vigorously opposed this proposed rule in a letter of May 7, 1975, to the Hearing Clerk, FDA. (Copies may be obtained from the Office of Weights and Measures at the National Bureau of Standards.) The committee now seeks ratification of this action.

(The foregoing item was adopted by voice vote.)

MODEL STATE UNIT PRICING REGULATION

1. Presentation of Price

The Southern Weights and Measures Association recommended the addition of the following provision to Section 6. PRESENTATION OF PRICE: If discounts are offered for buying more than a single like unit of a commodity then any additional units sold in the same transaction must be at the same unit price. (Example: If an item is priced at "15 cents each; three for 39 cents," then the fourth and succeeding items in the same transaction would be at the rate of 13 cents.)

The committee is of the opinion that weights and measures jurisdiction is limited to the determination of proper methods of presenting price and does not extend to restricting pricing practices. For this reason the committee is opposed to the adoption of the above suggested amendment.

(The foregoing item was adopted by voice vote.)

FUTURE ITEMS

Next year the committee plans to consider methods of sale for bailer and binder twine, along the lines of regulations of the State of Kansas, and methods of sale for onion sets and other types of bulbs. The committee, at this time, prefers that all bulbs sold at retail should be sold by count; but until a specific method is established, sale may be by weight, dry measure, or count. Additionally, the committee plans to consider extensive revisions to Section 15. MACHINE VENDED COMMODITIES.

The Committee on Laws and Regulations extends its thanks to all those members of the Conference and business and industry representatives who submitted items for consideration. Only through such continuing communications can the committee fulfill its function to the Conference.

R. L. Thompson, *Chairman*, Maryland
J. T. Bennett, Connecticut
R. M. Leach, Michigan
J. L. O'Neill, Kansas
C. H. Vincent, Dallas, Texas
T. N. Troy, *Staff Assistant*, NBS
H. F. Wollin, *Exec. Secy.*, NCWM

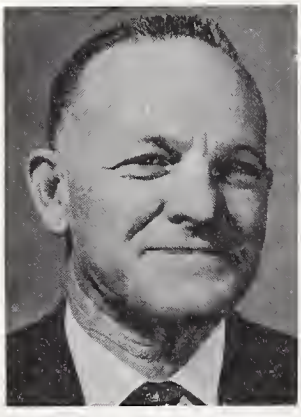
Committee on Laws and Regulations

(Mr. Thompson moved for adoption and, after a second from the floor, the report of the Committee on Laws and Regulations was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES

Presented by Walter S. Watson, *Chairman*, Chief, Division of Measurement Standards, Department of Food and Agriculture, State of California

(Thursday, July 17, 1975)



The Committee on Specifications and Tolerances submits its final report to the 60th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by its final report.

The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee. All recommended amendments are to appropriate provisions of the codes of the National Bureau of Standards Handbook 44, Fourth Edition, *Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices.*

This is perhaps a bit worn comment; but this year, the work of the S & T Committee has been greater than ever before. We have continued to refer to "a rapidly advancing technology." We know that this is more true today than in any other previous period.

The committee has attempted to recognize this new technology and include in NBS Handbook 44 adequate requirements; and in order to maintain a viable working document, we bit off a rather large chunk.

Attempting to respond, in a very short time period, to all the needs, we have listened to all interested parties before coming to any conclusions—truly a democratic process—and you know the wheels of democracy move slowly.

It's a lot easier, as is done in most of the rest of the world, for a relatively few government officials to sit down and write regulations that become requirements without regard to the views of other parties.

We have been criticized for a number of things this year, but do you realize the S & T Committee tentative report this year consists of 35 pages? (Previous years averaged about 15.) Our final report is 14 pages; previous years have been eight—which means that the input, your input, was received by the committee and changes were made.

At our open session on Monday, I commented that when we reconvened some of you would not be pleased with our decisions. There are a number of issues in which we suspect the views of the Conference are fairly evenly split; thus, we are bound to become unpopular with about fifty percent of you. But we are not here to win a popularity contest, rather we "bit the bullet" and made recommendations which we consider sound.

The key to reaching one of the goals of the National Conference on Weights and Measures is "uniformity" developed through a democratic process, and that means you can't win them all. Consequently, it is your moral obligation to return to your jurisdictions and do your utmost to enforce the will of the majority. We assure you that we will, whatever your decisions are on each and every item of this report.

We will now present this report for your action. Each item will be considered and acted upon individually, and we are ready to discuss any part or all of them.

GENERAL CODE

1. *G–S. 5. 6. Recorded Representations.*—A comment was received that analog recorded values are difficult to read; therefore, the code should be amended to require all recorded values be printed digitally.

The committee recommends that G–S. 5. 6. be amended by adding the following nonretroactive sentence to G–S. 5. 6. Recorded Representations:

All recorded values shall be printed digitally.

(The foregoing item was adopted by voice vote.)

CODE FOR SCALES

1. *Unit Prices on Electronic Computing Scales.*—A recommendation was received from the Northwest Weights and Measures Association to amend the code to restrict the capability of electronic computing scales from displaying and printing unit prices based on units of ¼ lb or ½ lb. During the interim meeting, this subject was discussed at length among all of the standing committees. As a result of these discussions and discussion at the Conference, the committee wishes to offer the following comments and recommendations:

(a) A random package bearing a label conspicuously declaring (1) the net weight, (2) the price per pound, and (3) the total price was given every consideration by Congress during the hearings on the Fair Packaging and Labeling Act. Congress indicated its declaration of policy in the passage of the Act as stated in Section 2 "to enable consumers to obtain accurate information as to the quantity of contents and should facilitate value comparisons." It was apparently the view of Congress that the label on a random package did in fact provide accurate information as to the quantity and facilitate value comparisons; and for those reasons, such a label was given special consideration in the Act and the regulations promulgated persuant thereto.

(b) A random package bearing a unit price based on ¼ lb or ½ lb units is a violation of Section 13 of the Model State Weights and Measures Law.

(c) Value comparisons by consumers are extremely difficult when, in the same display, there are unit prices based on 1 lb, ½ lb, or ¼ lb units. It is the committee's view that prices displayed in this manner do, in fact, tend to mislead and are in violation of Section 9, "Misrepresentation of Pricing," of the Model State Weights and Measures Law.

(d) Therefore, weights and measures officials should consider the advertising, posting, recording, or displaying of unit prices based on ¼ lb or ½ lb units in violation of the Model State Weights and Measures Law, Section 9, "Misrepresentation of Pricing," and Section 13, "Declarations of Unit Price on Random Packages."

(e) Multiple unit pricing (i.e., 7 lb/$1, 4 lb/89¢, etc.) in the sale of random weight items from bulk can confuse the consumer, frus-

trate value comparisons, and result in pricing errors. The committee is opposed to such pricing. However, until the advertising, posting or displaying of multiple unit prices is a prohibited method of sale of bulk commodities, the adoption of Handbook 44 provisions eliminating such capability from computing devices would increase the incidence of such pricing errors without ending the undesirable practice itself.

(f) Further, the committee recommends amending the Scale Code as follows:

Add the following sentence to paragraph S.1.6.3. Customer's Indications:

Unit price displays visible to the customer shall be in terms of the price per pound and not in fractions thereof.

A motion was made, seconded, and passed to amend this sentence to read:

Unit price displays visible to the customer shall be in terms of the price per pound and not in fractions or multiples of a pound.

"Remarks on Foregoing Item"

The committee expressed the view that it was its intent in the recommendation of amendment to paragraph S.1.6.3. to preclude the practice of pricing commodities in any manner other than per pound.

(The foregoing item as amended was adopted by voice vote.)

2. *Point of Sale Systems.*—Several recommendations were received concerning point of sale systems. After careful consideration, the committee recommends that the interpretation of the code as indicated in the final report of the S & T Committee of the 58th National Conference are appropriate. However, for further clarification, the committee recommends amendment to the code as follows:

S.1.6.4. Recorded Representations, Point of Sale Systems—The sales information recorded by cash registers when interfaced with a weighing element shall contain the following information for items weighed at the checkout stand:

(a) the net weight,*
(b) the unit price,*
(c) the total price, and
(d) product class or, in a system equipped with price look-up capability, the product name or code number.

***Weight values shall be identified by the word "pound" or the abbreviation "lb."**

The committee does not wish to restrict innovation by requiring a standard format for the printing of this information; however, the

committee wishes to recommend to manufacturers of this equipment to work together in the development of a standard format which would provide much better consumer readability.

(The foregoing item was adopted by voice vote.)

3. *Direct Sales with Prepackaging Scales.*—Communication was received from the City of St. Louis expressing concern over the use of a prepackaging scale in direct sales when a customer has used the call button at the meat display to request a particular cut of meat. It was the committee's view that it would be too restrictive to require the supermarket equipped only with prepackaging scales to have a computing scale located in the meat section for these few sale applications. It was further the committee's view that when these special cuts as requested are weighed on the prepackaging scale, that the customer should be provided the random label. Therefore, the committee recommends that paragraph UR. 3. 1. Prepackaging Scale be amended to read as follows:

UR.3.1. Prepackaging Scale.—A scale marked with the words "For Prepackaging Use Only" or with a statement of similar meaning shall only be used for putting up packages including special customer orders and shall not be used for weighing commodities intended to be delivered to the buyer in any manner other than in a properly labeled random package.

(The foregoing item was adopted by voice vote.)

4. *S.2.3. Leveling Indicating Means.*—A recommendation was received to amend this paragraph to require the level indicating means to be visible in normal operation. After careful consideration, it was the view of the committee that this recommendation be followed by manufacturers whenever possible. However, certain designs would require the level indicating means to extend out from the scale housing and be readily subject to damage. For this reason, the committee is not recommending amendment to the code but strongly urges manufacturers in future designs to place the level indicating means in a location that may be readily observable in normal operation.

(The foregoing item was adopted by voice vote.)

5. *S.2. Design of Balance, Tare, Level, Damping, and Arresting Mechanisms.*—The committee received numerous comments concerning the design of weighing systems including tare capability, zero setting, and damping means, especially with respect to the fraudulent aspects of these designs. The committee considered and discussed at length these comments. The discussion included tare beams, tare bars on cabinet dials, pushbutton zero/tare, and thumb-wheel tare on electronic digital indicators.

The comments and recommendations that follow were considered by the committee to be restrictive enough to prevent the facilitation of fraud and yet not so restrictive as to preclude the full application of existing technology and new innovations:

(a) Weights and measures officials should make certain that tare or automatic zeroing capability is appropriate for any given application. It is the committee's view that tare and automatic zeroing, with appropriate design constraints to prevent the facilitation of fraud, are appropriate.

The committee further expressed the view that if a tare capability is provided in a direct sale application, the design must meet the requirements of paragraph G–S.5.1. Indicating and Recording Element, General; that is, primary indications shall be clear, definite, accurate, and easily read under any conditions of normal operation of the device.

(b) In nondirect sale applications, it is the committee's view that most existing technology (i.e., push-button zero or tare) is appropriate since the party making the weight determination has available to him many other convenient means for fraud. In these applications, it is important that the equipment provide the operator with clear, definite, accurate, and easily read indications and recorded representations under any conditions of normal operation of the device.

(c) With respect to tare bars on cabinet dials, it is the committee's view that if the enforcement official determines that tare is not appropriate in a given installation, they not be allowed on new installations; and in existing installations, the tare bars and poises be removed.

(d) It is the committee's view that it is appropriate for electronic digital indicating scales to indicate values in excess of nominal capacity not to exceed 105 percent, providing the equipment maintains accuracy to that extent. It is also the committee's view that any tare or push-button zero capability used for this equipment should subtract from the nominal capacity. That is, if a 100,000 lb scale has the capability of indicating up to 105,000 lbs. it must maintain its accuracy up to that load; and if a 50,000 lb tare was taken, the maximum net value that could be indicated would be 55,000 lbs.

(e) The committee recommends the following nonretroactive amendments to the code:

Change S.2.1.2. to read:

S.2.1.2. On Scales Used in Direct Sales.—A mechanical mechanism (except for a balance ball or on digital scales with an analog zero adjustment mechanism with a range of not greater than one minimum increment) shall be operable or accessible only by a tool outside of and

entirely separate from this mechanism, or enclosed in a cabinet. *A balance ball shall not itself be rotatable unless it is automatic in operation or is enclosed in a cabinet (nonretroactive as of 1956 and to become retroactive on January 1, 1976).*

An electronic mechanism designed to be manually operated to provide an automatic zero balance condition ("pushbutton zero") shall be operable or accessible only by a tool outside of and entirely separate from this mechanism, or enclosed in a cabinet, or shall be operable only when the indication is stable within:

(a) plus or minus 1 increment for systems of 5000 lbs capacity or less, and

(b) plus or minus 3 increments for systms of more than 5000 lbs capacity. (Nonretroactive and enforceable as of January 1, 1977 and to become retroactive as of January 1, 1981)

Add the following new paragraph S.2.4.1.:

S.2.4.1. Electronic Elements.—*Electronic indicating elements equipped with recording elements shall be equipped with effective means to permit the recording of weight values only when the indication is stable within:*

(a) plus or minus 1 increment for systems of 5000 lbs capacity or less, and

(b) plus or minus 3 increments for systems of more than 5000 lbs capacity. The values recorded shall be within applicable tolerances. (Nonretroactive and enforceable as of January 1, 1977 and to become retroactive as of January 1, 1981)

Add the following new paragraph S.1.4.1:

S.1.4.1. Capacity Indication.—*A digital indicating element and recording element shall not display or record any values when the gross platform load is in excess of 105 percent of the nominal capacity of the system. (Nonretroactive and enforceable as of January 1, 1977 and to become retroactive as of January 1, 1981)*

(The foregoing item was adopted by voice vote.)

6. *S.4.2. Adjustable Weighing Elements.*—Based on a recommendation received to clarify this paragraph, the committee recommends amendment to the code as indicated below. It was also the view of the committee that the nose-iron position on scales of 2000 lbs or less not be defined at the factory.

S.4.2. Adjustable Components.—An adjustable component such as a nose-iron, pendulum, spring, or potentiometer (but not a component for adjusting level or zero-load balance) shall be held securely in adjustment and shall not be adjustable from the outside of the scale. The position of a nose-iron on a scale of more than 2000 lbs capacity, as determined by the factory adjustment, shall be accurately, clearly, and permanently defined.

(The foregoing item was adopted by voice vote.)

7. *S.6. Marking Requirements.*—A recommendation was received from the Southern Weights and Measures Association that this section be amended to require a single plate with a standard format for all information required to be marked on scales. Comments from scale

manufacturers indicated that this was impractical since electronic indicating elements are interfaced with weighing elements of varying nominal and sectional capacities and are appropriately marked at the time of installation. It was the committee's view that if devices are conspicuously marked with the information required by G–S.1. Identification and S.6. Marking Requirements that a single plate with a standard format, although desirable, is not necessary.

(The foregoing item was adopted by voice vote.)

8. *UR.2. Installation Requirements.*—A recommendation was received from the Southern Weights and Measures Association that this section be amended with specific requirements for approaches to vehicle scale. The committee was informed that a number of states had already adopted some regulations. It was the committee's view that approaches have an effect on weighing accuracy and scale maintenance and that uniform requirements should be adopted, therefore, it recommends the following amendments. These amendments are consistent with the Scale Manufacturers Association's "Recommendation for the Design and Installation of Pit-Type Scales for Weighing Highway Vehicles and Their Axle Loads," which was endorsed by the 57th National Conference.

UR.2.6. Approaches

UR.2.6.1. To Vehicle Scales.—On the approach end or ends of a vehicle scale installed in any one location for a period of six months or more, there shall be a straight approach in the same plane as the platform. The approach shall be the same width as the platform and at least one half the length of the platform. Not less than ten feet of any approach adjacent to the platform shall be constructed of concrete.

UR.2.6.2. To Axle Load Scales.—At each end of an axle load scale there shall be a straight paved approach in the same plane as the platform. The approaches shall be the same width as the platform and of sufficient length to insure the level positioning of vehicles during weight determinations.

A motion was made, seconded, and passed that the recommended new paragraph UR.2.6.1. be nonretroactive.

(The foregoing item as amended was adopted by voice vote.)

9. *Radio Frequency Interference (RFI).*—The committee received comments from the Northwest and Western Weights and Measures Associations and the State of California that notes and testing procedures be developed for radio frequency interference tests on electronic digital scales. After hearing many comments from weights and measures officials and the Scale Manufacturers Association, the committee does not have sufficient information at the present time to recommend code amendment.

The Scale Manufacturers Association has formed a subcommittee to study radio frequency interference and will have a proposal for

the next interim meeting of the S & T Committee. However, the committee wishes to remind weights and measures officials that all weighing and measuring equipment must meet the performance criteria (tolerances) on all installations. Therefore, if an electronic digital indicator is installed in an environment where a radio frequency phenomenon proves to interfere with its performance, the indicator must be appropriately shielded or the interference removed so that the device performs accurately.

The following information is prepared for use by weights and measures personnel, and outlines procedures for identifying RFI as a cause of electronic weighing malfunction. It should be noted and recognized that RFI problems can be steady and obvious, or intermittent and obscure; the latter conditions are naturally the most difficult to identify.

I. Checking for Equipment Stability Under RFI Conditions

It is reasonable to require that the weighing equipment be capable of operating under all normally encountered conditions. If a potential source of RFI is evidently present (see Part IV), it should be operated as it is intended, in its normal location, and its effects observed. If the weighing equipment is affected, the actions described in Part VI are indicated.

"Note: When attempting to isolate a problem caused by portable equipment, the equipment should only be operated within the proximity to the equipment expected in normal operation. Even a system with extremely good RFI resistance characteristics may be affected if the RFI source is operated in extremely close proximity to the weighing equipment."

II. Indications of Radio Frequency Interference

A. In a properly installed and adjusted system, Radio Frequency Interference will be evidenced by one or more of the following weight display indications:
   1. Continually unstable display (continuous source).
   2. Intermittently unstable or offset (high or low) display (intermittent source).
   3. Regularly unstable or offset (high or low) display (regularly repetitive source).

B. RFI effects on accessory items such as printers or displays will usually be evidenced at the instrument before they become an accessory problem, since the instrument circuits are more sensitive to interference problems.

An exception to this general rule could occur where an RFI protected instrument was provided as a standard part of a system which included non-protected accessories. This condition would show as a difference between the indicator and accessory. Intermittent operation of accessory equipment without command would also symptomize RFI.

III. Checking for Radio Frequency Interference

The unstable or offset weight display conditions described in Part I will indicate the presence of RFI. To further identify RFI as the problem, have the following quick checks performed:

1. Turn the instrument 90° to either side; if the display condition changes, RFI is suspect.
2. Disconnect any plug-in accessories; if the display condition changes, it is quite possible that the connecting cable is acting as an RFI "antenna" (See Part VI—Action).
3. Physically touch any bare metal grounded portion of the instrument or chassis; if this application of body capacitance causes the display to change, RFI is suspect.
4. Use a jumper wire to connect an alternative ground path between any bare metal portion of the instrument or chassis and a known ground point (water pipe, conduit, etc.); again, if the display changes, RFI is suspect.

In general, if any rearrangement of the normal conditions of the instrument cause a display change, RFI is indicated.

IV. Typical Sources of Radio Frequency Interference

Any source of electrical radiation to the air is a potential RFI originator. The closer or stronger the source, the greater the possibility of interference effects. Those most frequently encountered are developed by communication and electrical equipment.

A. Communication Sources:

1. Commercial transmitters (radio or television)
2. Two-way radio transceivers (citizens band, police, ham radios)
3. Closed-circuit television monitoring equipment
4. Electronic burglar alarm systems
5. Microwave systems (radar, telecommunications, telemetry)
6. Navigational beacons (airports, harbors)
7. Radio and TV receivers in the immediate area

B. Electrical Noise Sources

In addition to noise-generating equipment sharing the same power source as the weighing equipment (which most specifications prohibit), electrical devices and systems are frequently capable of radiating sufficient RFI to effect weighing equipment performance.

1. Engine ignition systems (trucks on motor truck scales).
2. Office equipment (adding machines, calculators, typewriters, copiers).
3. Vending machines.
4. Appliances (air conditioners, fans, refrigerators, microwave ovens, mixers).
5. Stock handling equipment (elevators, fork trucks, hoists).
6. Relay switching equipment (motor controls and industrial controls).
7. Motors and generators; especially DC and brush-type AC (electric tools, alternators, etc.).

V. Isolating RFI Sources

If possible, the quickest way to identify a suspected RFI source is to disconnect it or switch it off; if the weight display malfunction ceases, identification is positive.

RFI caused by commercial communication sources can frequently be identified by using common receiving equipment such as a radio. For example, nearby high strength radio or TV stations can be identified by a strong receiving signal, and the carrier wave modulation (sound level) will sometimes cause simultaneous instability of the weight display. Certain radar or navigational sources will cause corresponding interference in radio reception.

VI. Action

When confronted with evidences of radio frequency interference, the inspector generally has only two courses of action:

1. Have the scale user/owner remove the source of RFI.
2. Reject the scale and recommend service. RFI effects can be eliminated by qualified service personnel.

(The foregoing item was adopted by voice vote.)

10. *Wheel-Load Weighers.*—To recognize a design of portable weighing elements used in the same manner as wheel load weighers with the capability of weighing single or tandem axles, the committee recommends amending this definition as follows:

Wheel-load weighers. Compact, self-contained, portable weighing elements specially adapted to determine the wheel loads or axle loads of vehicles on highways for the enforcement of highway weight laws only.

(The foregoing item was adopted by voice vote.)

11. *Railroad Track Scales.*—The committee received recommendations from many organizations recommending a separate code for railroad track scales. The committee agreed with this recommendation; however, in reviewing the code, found that there were only seven paragraphs that dealt exclusively with railroad track scales. The remaining code requirements; that is, all of the sections dealing with graduations, indicators, weighing elements, weigh beams, and poises, are applicable to railroad track scales except those directed specifically to computing scales, prescription scales, etc. Therefore, it is the committee's view that until such time that there are more requirements applicable to railroad track scales only, the added administrative cost to duplicate substantial portion of the Scale Code in a separate railroad track scale code is not warranted at this time.

(The foregoing item was adopted by voice vote.)

12. *Coupled-In-Motion Unit Trains.*—The committee received a recommendation that the code be amended to provide a separate tolerance of plus or minus one percent for individual car weights when a particular scale was used commercially for unit trains only.

It was also recommended that a unit train for commercial applications be defined. The committee heard comments from scale manufacturers, railroad representatives, and users of railroad track scales. The committee concluded that the tolerance structure as presently set forth in T.3.6.3. and T.3.6.4. does, in fact, apply to all railroad track scales used for coupled-in-motion weighing. This conclusion is based on the evidence presented the committee over the last two years while the committee was in the process of developing tolerances and other requirements for these types of scales. Therefore, the committee recommends no amendment to the code and that devices used to weigh coupled-in-motion unit trains should meet the requirements of paragraph T.3.6.3. and paragraph T.3.6.4. when being tested.

(The foregoing item was adopted by voice vote.)

13. *The Weighing of Gold.*—Since the purchase, sale, and ownership of gold became legal in the United States as of December 31, 1974, the committee reviewed the Scale Code requirements applying to jewelers scales and other considerations dealing with the sale of gold. It became evident that it was necessary to amend the code to provide design and performance criteria for scales to be used by retail gold dealers. Also to be considered was appropriate weighing equipment to be used in a new method of sale of certain jewelry (i.e., silver and turquoise bracelets and necklaces and the like).

The committee was informed that the weight of the gold introduced into commerce would be marked on the ingot, coin, or wafer by the refiner. It was further understood that the actual exchange or possession of gold would be limited and the dealer (banks, etc.) would retain possession of the gold and a paper transaction would indicate ownership. However, if a purchaser were to take possession of the gold and later resell it to the original seller or other dealer, it would then be necessary for the dealer to determine whether or not the weight indicated on the ingot, coin, or wafer was still valid.

It was the committee's view that it would not be necessary that these dealers equip themselves with balances with performance capabilities equal to one part in 5,000 or one part in 10,000. However, it was the committee's view that it would be necessary for refiners to use balances with that degree of accuracy to make certain that the weight markings were correct.

To provide realistic requirements for jewelers scales to be used for check-weighing by gold dealers and the sale of costume jewelry, the committee recommends the following amendments to the code:

SR.3. For Prescription Scales.—The SR shall be 0.1 grain (6 milligrams).
SR.4. For Jewelers Scales.
SR.4.1. With a Capacity of One-Half Ounce or Less.—The SR shall be 0.1 grain (6 milligrams).

SR.4.2. With a Capacity of More Than One-Half Ounce.—The SR shall be the value of the minimum graduated interval of the device.

Renumber present paragraphs SR.4., SR.5., SR.6., and SR.7. to SR.5., SR.6., SR.7., and SR.8. respectively.

T.2.3. For Jewelers Scales.

T.2.3.1. With a Capacity of One-Half Ounce or Less.—The minimum tolerance shall be 0.1 grain (6 milligrams).

T.2.3.2. With a Capacity of More Than One-Half Ounce.—The minimum tolerance shall be one half the value of the minimum increment.

T.3.3. For Jewelers Scales.—The basic maintenance and acceptance tolerance shall be 0.05 percent of the test load.

The committee wishes to offer the following concerning gold dealing for your information and guidance. It should be helpful to you in the event of inquiries or complaints. The recommendations have been issued by the President's Special Assistant for Consumer Affairs, the Department of Justice, the Federal Trade Commission (FTC), the U.S. Postal Inspection Service, and the Securities and Exchange Commission (SEC). The following has been extracted from the Federal Register, dated December 24, 1974:

> Various Federal and State regulatory agencies will regulate gold trading. The SEC regulates public interstate offerings of and trading in securities related to gold. Federal law prohibiting unfair or deceptive acts in interstate commerce is enforced by the FTC. Trading in gold commodity futures and transactions involving margin and leverage contracts in gold bullion and bulk gold coins will be regulated effective April 21, 1975 by the recently created Commodity Futures Trading Commission. Federal laws against securities and mail fraud will be enforced by the SEC, the Postal Inspection Service, and the Department of Justice. Justice Department has underway a major effort to detect and prosecute the growing number of frauds involving gold and other precious metals.
>
> The purchase of and investment in gold is a potentially fertile area for unscrupulous promoters and fraudulent schemes. Moreover, the price of gold is oftentimes dictated by speculative interests rather than industrial supply and demand, and is subject to significant and rapid fluctuations.
>
> Inquiries or complaints regarding unfair or deceptive trade practices, including false or misleading advertisements, should be addressed to the FTC's Division of Special Statutes, 7th Street and Pennsylvania Ave., N.W., Washington, D.C. 20580.

Weights and measures officials should be prepared to deal with complaints concerning the weight of gold. In order to determine the actual weight of a quantity of gold, a balance with performance capabilities of one part in 10,000 should be used.

A motion was made and seconded to table this item. The motion to table was defeated.

(The foregoing item was adopted by voice vote.)

1. *S.1.1.3. Value of the Smallest Unit.*—The committee received a comment that a digital device which met the requirements of this paragraph, i.e., with the value of the smallest unit being 0.1 gallon, it would be impossible to determine the performance of the device since the uncertainty at any given indication would be ±0.05 gallons (11.55 in^3). It is the committee's view that it is not necessary to amend this requirement since this paragraph is intended to set forth the maximum value of the smallest unit and that if in fact the value of the smallest unit was too large to prove the performance capabilities, it would not meet the requirements of paragraph G–S.5.1. Indicating and Recording Elements, General.

(The foregoing item was adopted by voice vote.)

2. *S.2.1. Vapor Elimination.*—The committee received a recommendation from the Northwest and Western Weights and Measures Associations that this paragraph be amended to require that the means provided to prevent the passage of air and vapor through the meter be automatic in operation since a user could imply that he was utilizing manual means during sales. It was the committee's view that it would be unenforceable if the means provided were manual; and the committee recommends amendment to the code as follows:

S.2.1. Vapor Elimination.—A liquid-measuring device or metering system shall be equipped with an effective vapor eliminator or other effective means, automatic in operation, to prevent the passage of vapor and air through the meter. Vent lines from the air or vapor eliminator shall be made of metal tubing or some other suitably rigid material.

(The foregoing item was adopted by voice vote.)

3. *Metric Tolerances.*—At its interim meeting, the committee heard a comprehensive report from Sun Oil Company concerning a study being conducted on the retail sale of gasoline in metric units. The study indicated that trial metric retail petroleum dispensers were installed in Pennsylvania and Florida in cooperation with those respective weights and measures jurisdictions. To meet the needs for tolerances for this equipment and future equipment, the committee recommends the following metric tolerances be included in the code:

TABLE 1.—TOLERANCES FOR RETAIL DEVICES. EXCEPT SLOW-FLOW METERS AND EXCEPT ON ELAPSED-TIME TESTS

Indication	Maintenance tolerance	Acceptance tolerance
U.S. Customary Units	(On normal and on special tests)	(On normal and on special tests)
Gallons	*Cubic inches*	*Cubic inches*
½ or less	2	1
1	3	1½
2	4	2
3	5	2½
4	6	3
5	7	3½
Over 5	Add 1 in^3 per indicated gallon	Add ½ in^3 per indicated gallon
Metric Units		
Liters	*Cubic centimeters*	*Cubic centimeters*
5	60	30
10	80	40
15	100	50
20	120	60
Over 20	Add 4 cm^3 per liter	Add 2 cm^3 per liter

(The foregoing item was adopted by voice vote.)

4. *Indicating Elements on Retail Petroleum Dispensers.*—The report from Sun Oil Company also presented survey data concerning the utilization of a different display of the money value for a total sale than is presently being used in the United States; specifically, the utilization of two decades on the least significant wheel of the display. This is accomplished with the use of one cent graduations with a numerical figure associated with each five cent graduation. Thus the total capacity of this least significant wheel is $1.00 Although there are no specific code requirements which would not allow this application, other than general readability, Sun Oil Company decided to get consumer reaction and the view of the committee since it was a departure from existing displays. (The use of this "two decades on one wheel" is in widespread use in other parts of the world.) This equipment together with the results of the survey was made available by Sun Oil Company at the 60th National Conference.

It is the committee's view that this technology meets existing requirements of Handbook 44 and is appropriate.

(The foregoing item was adopted by voice vote.)

5. *One-Half Unit Price on $.499 Variators.*—The committee received comment that modifications were readily available for this equipment and that industry was slow in making the change. Based

on all information the committee was able to obtain on this subject, the committee recommends that jurisdictions set as a final enforcement date for this conversion January 1, 1976.

(The foregoing item was adopted by voice vote.)

6. *Color Coding for Fill Openings for Underground Storage Tanks at Retail Service Stations.*—The committee received a suggestion that it be required that these fill openings be uniformly color coded throughout the industry, especially because of the problems brought about by unleaded product. The committee was informed that the American Petroleum Institute had attempted to gain a consensus with respect to colors and was unable to do so. The committee felt that it should address itself to the problem but could not specify particular colors and makes the following recommendation:

Add the following new paragraph UR.2.5.:

UR.2.5. Product Storage Identification.—The fill connection for any petroleum product storage tank or vessel supplying motor fuel devices shall be appropriately marked as to product contained.

A motion was made, seconded, and passed to amend this recommended new paragraph UR.2.5. to read:

UR.2.5. Product Storage Identification.—The fill connection for any petroleum product storage tank or vessel supplying motor fuel devices shall be permanently, plainly and visibly labeled as to product contained.

(The foregoing item as amended was adopted by voice vote.)

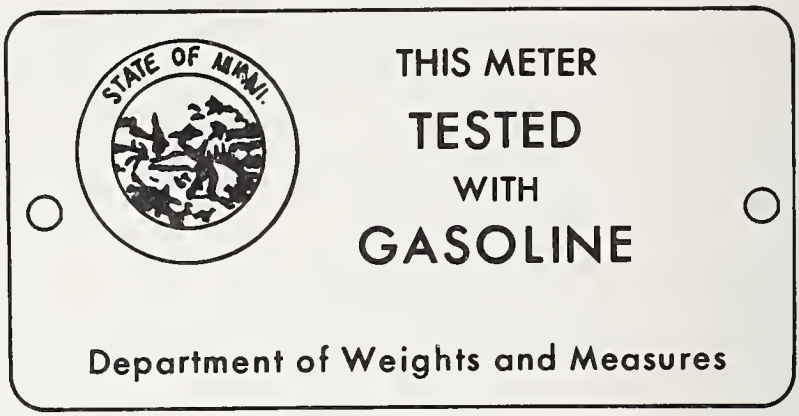
7. The committee received a suggestion from Ventura County, California that the code be amended to require that approval seals applied by weights and measures officials to liquid measuring devices indicate the product used during the test. It was the committee's view that it could not develop a requirement directed towards the manufacturer or the user but that it was appropriate that these devices be so marked.

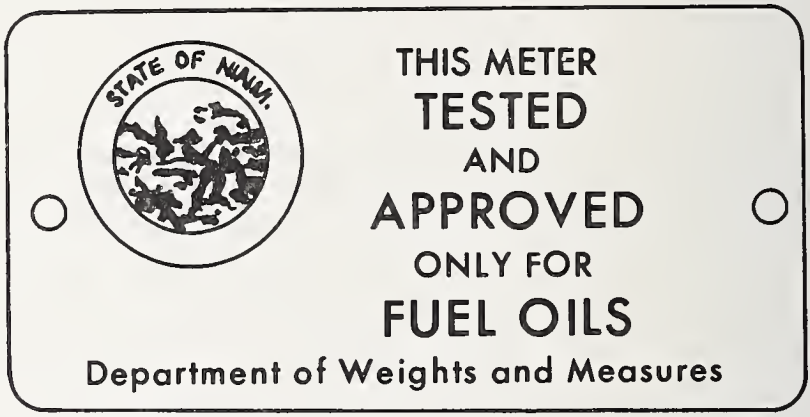
Since the Note section addresses itself to weights and measures officials, it was the committee's view that amendment could be made in that section indicating to officials that approval seals applied should contain that information. Therefore, the committee recommends that the Liquid Measuring Device Code and Vehicle Tank Meter Code be amended as follows:

Amend paragraph N.1. by adding the following sentence to the end of that paragraph:

A seal or tag should be attached by the weights and measures official following a satisfactory examination indicating the product used during the test.

The plates used by a particular jurisdiction are illustrated below: the one marked for gasoline products is red, and the one for fuel oil products is green.





(The foregoing item was adopted by voice vote.)

CODE FOR VEHICLE TANK METERS

1. *N.1. Test Liquid.*—See Item 7 of the Code for Liquid Measuring Devices.

(The foregoing item was adopted by voice vote.)

CODE FOR LPG LIQUID MEASURING DEVICES

1. *S.3.1. Diversion of Measured Liquid.*—The committee received a recommendation from the Southern Weights and Measures Association that this code be amended to provide for two or more outlets on the outlet side of the meter. The committee heard comments from the meter manufacturers and users expressing the appropriate-

ness and need for this application. The committee recommends paragraph S.3.1. be amended to read:

S.3.1. Diversion of Measured Liquid.—No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or the discharge line therefrom. However, two or more delivery outlets may be permanently installed if means are provided to insure that:

(a) liquid can flow from only one such outlet at one time, and
(b) the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.

In addition, a manually controlled outlet that may be opened for the purpose of emptying a portion of the system to allow for repair and maintenance operations shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the device and to indicate clearly and unmistakably when the valve controls are so set as to permit passage of liquid through such outlet.

With the addition of this requirement, the committee wishes to remind weights and measures officials that during an examination of a particular device equipped in this manner, normal tests and special tests must be conducted with the appropriate discharge rates on each outlet. Tests should be conducted to make certain that the valves operate as intended.

(The foregoing item was adopted by voice vote.)

CODE FOR LPG VAPOR MEASURING DEVICES

1. *UR.2.3. Corrections for Altitude.*—The committee received a comment from the State of Wisconsin that this was a difficult, if not impossible, requirement to enforce. It was the view of the committee that since altitude has an effect, in many instances greater than the applicable tolerances, it is necessary that this requirement be met. However, it must be clearly understood that there is no need for additional technology for devices used at higher altitudes; rather, those devices be simply marked with the altitude correction factor and that the invoice for billing include the information that the quantity on which the charges are based has been corrected for altitude and the factor used in this correction. The committee recommends that paragraph UR.2.2. Invoices be amended to read as follows:

UR.2.2. Invoices.—Any invoice on which the charge is based on units other than cubic feet or cubic meters shall have shown thereon the cubic foot or cubic meter equivalent of the unit on which the charge is based. [Added 1972] Any invoice shall also include the altitude correction factor utilized in determining the quantity on which the charges are based.

Considerable discussion on this item ensued, resulting in a motion to table the item for one year; the motion was defeated.

(The foregoing item was adopted by voice vote.)

2. *Definitions.*—At the suggestion of the Office of Weights and Measures, the committee recommends amendment to the definitions of this code by adding the following:

cubic foot, metered. That quantity of gas which occupies one cubic foot when under pressure and temperature conditions existing in the meter.*

cubic foot, standard. That quantity of gas which occupies a volume of one cubic foot when under a pressure of 14.73 psia and at a temperature of 60 ° F.*

(The foregoing item was adopted by voice vote.)

CODE FOR FARM MILK TANKS

1. *Farm Milk Tanks.*—The committee received a recommendation from the State of California concerning farm milk tanks. This recommendation was well documented. The committee agrees with the proposal and recommends code amendment accordingly. The proposal, as received by the committee, is reprinted in its entirety to serve as an example to other Conference members wishing to offer future proposals to the S & T Committee for their consideration:

PROPOSAL #1: TOLERANCES

Problem:

Due to the ever increasing average size of commercial milk tanks, a problem has developed with the tolerance structure.

Tanks as large as 15,000 gallons are now in commercial use. Five thousand gallon tanks are becoming common.

The present tolerance table for milk tanks is designed in such a manner that the allowable percentage of error decreases as the test draft increases.

Example:	Test Draft Gallons	Tolerance Gal.	%
	1,000	2	.20%
	5,000	6	.12%
	10,000	10	.10%
	15,000	14	.09%

* Source: American National Standards Institute, Inc. "American National Standard for Gas Displacement Meters (500 Cubic Feet per Hour Capacity and Under)," First Edition, 1974.

The uncertainty of a volumetric prover certified by a state laboratory has been determined to be ±.04 percent.

Reference: "Meter Manual" pp. 11 and 12 by: Meter Manufacturers Technical Committee

Section 3.2. under Testing Apparatus in the Fundamental Considerations issued with H–44 states that the error of a standard should not be greater than 25 percent of the smallest tolerance to be applied. This means that the minimum tolerance which should be applied to any device proved by a volumetric prover should never be less than .16 percent. (.16% × 25% = .04%)
Therefore, we have a situation where either our standards are no longer suitable for the testing of milk tanks or the tolerance is too small.

To further illustrate the problem, we must consider the possibility of a tank being calibrated by a commercial calibrator using a ertified prover with a .04 percent error in one direction and then being proved by a weights and measures official using a certified prover with a .04 percent error in the other direction, resulting in the generation of an error of .08 percent. This proving error consumes almost all of the present tolerance, leaving practically nothing for human error or tank variations.

Proposed solution:

Since it is not practical to expect that the uncertainty of the volumetric standard can be reduced, we propose that the tolerance for milk tanks be amended as follows:

(Items to be deleted are shown lined out; new words are underlined.)

T.2. Minimum Tolerance Values.—On a particular tank, the maintenance and acceptance tolerances applied shall be not smaller than the ~~smallest~~ volume corresponding to the graduated interval at ~~any~~ the point of test draft on the ~~gage rod or surface gage~~ indicating means or one-half gallon whichever is greater.

T.3. Basic Tolerance.—Basic maintenance and acceptance tolerances shall be ~~shown in table 1. (The error at any liquid level of a farm milk tank is the difference between the gallonage shown for that level on the gallonage chart and the corresponding gallonage determined by test. The tolerance is applied according to the volume of test liquid in the tank at each test draft, regardless of the nominal capacity of the tank)~~ 0.2% (2/10%) of the volume of test liquid in the tank at each test draft.

Table 1—Delete entire table.

For the committee's further information, the following chart has been prepared to show a comparison between existing tolerances (both milk tank and milk meter) and the proposal.

Test Draft	H–44 Existing Tank Tolerance		Proposed Tank Tolerance		H–44 Existing Milk Meter Tolerance	
gals.	*gals.*	*%*	*gals.*	*%*	*gals.*	*%*
100	½	.50%	½*	.50%	½	.50%
250	½	.20%	½	.20%	.7	.28%
251	1	.40%	½	.20%	.7	.28%
500	1	.20%	1	.20%	1.3	.26%
501	2	.40%	1	.20%	1.3	.26%
1000	2	.20%	2	.20%	2.3	.23%
1001	3	.30%	2	.20%	2.3	.23%
1500	3	.20%	3	.20%	3.3	.22%
1501	4	.27%	3	.20%	3.3	.22%
2000	4	.20%	4	.20%	4.3	.22%
2001	5	.25%	4	.20%	4.3	.21%
5000	6	.12%	10	.20%	10.3	.21%
10000	10	.10%	20	.20%	20.3	.20%
15000	14	.09%	30	.20%	30.3	.20%

(*Min. tolerance applies)

PROPOSAL #2: TESTS by MASTER METER METHOD

Problem:

Due to the ever increasing average size of commercial milk tanks requiring more manhours per test, a need has developed for a faster method of proving.

Some states have already developed a proving system using a master meter method. This has proved to be a rapid method which allows readings to be taken at strategic points in the tank. The problem with a master meter system is that it may very well have an accuracy error of its own which exceeds the tolerance for a milk tank. It has already been shown that a certified prover has an uncertainty of ± 0.04 percent. If you use this prover to certify a master meter system, the best you can expect from that system is ± 0.1 percent uncertainty. (Uncertainty of prover + sensitivity of indicating elements + repeatability of manual operations "human error.")

Consequently, the minimum tolerance that should be applied to a device checked by the master meter method is ± 0.4 percent (4/10%).

Proposed solution:

In an effort to take advantage of this rapid method of proving tanks by master meter and still control the basic accuracy of milk tanks at a reasonable level, we propose the following amendments to H-44 Code for Milk Tanks:

(Items to be deleted are shown lined out: new words are underlined.)

Adopt new section N.5 as follows:

N.5. Test Methods.—Acceptance tests of milk tanks shall be the prover method or with a metering system capable of operating within 25%

of the applicable tolerance. Subsequent tests may be of either the prover method or the master meter method.

A motion was made, seconded, and passed to amend this recommended new paragraph N.5. to read:

N.5. Test Methods.—Acceptance tests of milk tanks may be of either the prover method or the master meter method provided that the metering system is capable of operating within 25% of the applicable tolerance found in T.3. Subsequent tests may be of either the prover method or the master meter method provided that the metering system is capable of operating within 25% of the applicable tolerance found in T.4.

Adopt a new section T.4. as follows:

T.4. Basic Tolerance Values, Master Meter Method.—Basic maintenance and acceptance tolerances for tanks tested by the master meter method shall be .4 percent (4/10%) of the volume of test liquid in the tank at each test draft.

Add the following to "Definition of Terms":

acceptance test. Refers to the first time a milk tank is officially tested and accepted at a particular location. Applies to tests of newly constructed tanks as well as relocated, used tanks.

master meter method. A method of testing milk tanks which utilizes an approved master meter system for measuring test liquid removed from or introduced into the tank.

prover method. A method of testing milk tanks which utilizes approved volumetric prover(s) for measuring the test liquid removed from or introduced into the tank.

(The foregoing item as amended was adopted by voice vote.)

CODE FOR TIMING DEVICES

1. S.1.1.3. Value of Smallest Unit.—After two years as a tentative code, the Timing Device Code was made final, effective January 1, 1975, by action of the 59th NCWM. The committee received several recommendations for amendments to this code, and during its interim meeting heard presentations by three industry representatives. Based on the information received and the discussions, the committee recommends the following:

Amend S.1.1.3. Value of the Smallest Unit, subsection (c), by striking the words "One minute" and inserting the words "Five minutes" so as to read:

(c) Five minutes on all other devices, except those equipped with an in-service light.

Amend T.1.1. to read:

T.1.1. Tolerance Values, For Laundry Driers and Car-Wash Timers.—The maintenance and acceptance tolerances shall be:

(a) on overregistration, no tolerance, and
(b) on underregistration, six seconds per indicated minute.

Amend T.1.2. to read:

T.1.2. Tolerance Values, For Time Clocks and Time Recorders.—The maintenance and acceptance tolerances on overregistration and underregistration shall be three seconds per hour, not to exceed one minute per day.

Delete paragraph T.1.2.1. and paragraph T.1.2.2.

Amend Table 1. Maintenance and Acceptance Tolerances for Parking Meters, by changing the first entry in the third column to read:

10 seconds per minute, but not less than two minutes

Amend UR.3. by adding the following sentence to the end of that paragraph:

In addition, the time reading of the "time-out" clock shall be the same as or less than the reading of the "time-in" clock.

The committee heard presentations by representatives of two meter manufacturers concerning the use of parking meters in which there was no indication of time remaining but simply an indication of either "legal time" or "violation" or a brief indication of the time purchased and then "legal time" or "violation." Printed on the meter was the amount of time received for a specific sum; for example, "30 min. for each nickel." It was stated that many municipalities wanted to use this type of meter to preclude the use of remaining time, as indicated, by a subsequent parker. It was the committee's view that an indication of purchased time remaining is important to consumers, but the disappearing time dial did have some advantage. Therefore, the committee recommends amendment to the code by adding the following paragraph:

S.1.1.6. Discontinuous Indicating Parking Meters.—Convenient means shall be provided to indicate to the purchaser the unexpired time.

It was also brought to the committee's attention that in the testing of parking meters, officials were beginning the time interval test when the indicator was in coincidence with the time graduation. Industry representatives testified that a parking meter is a timing device, not a clock; therefore, the time interval under test should begin at the moment the meter is activated by either the insertion of a coin on automatic meters or the operation of the manual activating control. When the meter is activated, the indicator will advance to some position either coincidental with the graduation or some

distance beyond. This means that the customer will always get at least the time paid for, since there is no tolerance on overregistration; and the extra time, or underregistration, should be within the tolerances stipulated in table 1.

"Remarks on Foregoing Item"

Considerable discussion on this item ensued. A motion was made and seconded to add an additional User Requirement to the code as follows:

UR.4. Parking Meters Used for Traffic Control.—Parking meters used for enforcement of parking time limitation laws or ordinances on public thoroughfares, shall not be subject to the provisions of paragraph S.1.1.6.

The addition of this recommended paragraph UR.4. was defeated by a standing vote.

(The foregoing item was adopted by voice vote.)

OTHER ITEMS

1. Grain Moisture Meters.—The committee was informed that NBS is conducting a study on grain moisture meters. The study is being conducted by Mr. Frank E. Jones, Humidity Section, Institute for Basic Standards, NBS, and the Office of Weights and Measures. Several states will be requested to participate in this study. The committee recommends that individual states do not take independent action on the development of a code for grain moisture meters until completion of this study.

A motion was made and seconded to amend this item by changing the last sentence in the item to read:

The committee recommends that individual States do not take independent action on the development of a code for grain moisture meters until completion of this study, providing the study is completed by January 1, 1977.

This amendment to the item was defeated by a standing vote.

(The foregoing item was adopted by voice vote.)

2. The Swing to Metric.—The committee discussed at length the expanding use of the metric system in the United States and the possibility of a conversion to metric in the commercial measurement system.

Included in the discussion was U.S. participation in the International Organization of Legal Metrology (OIML). All International Recommendations of OIML are metric. It was the committee's view that publications such as NBS Handbook 44 and 105–1 could not adequately provide metric equivalents. Therefore, it was the decision of the committee that existing publications of these types should remain in the U.S. Customary System and be applicable

to U.S. Customary weights and measures. The committee felt that to deal with metric and provide hard conversion, a Handbook 44 M (metric) and a Handbook 105–1 M (metric) should be developed.

The committee did discuss the progression of units or series used in weight sets. OIML requires weight sets to be in a 5, 2, 1 series with either the 2 or the 1 repeated (for example, 50, 20, 20, 10, 5, 2, 2, 1, .05, .02, .02, .01).

It is the view of the committee that for international uniformity weights used commercially in the U.S. should be in a 5, 2, 1 series and that any series deemed appropriate for other applications (for example, 5, 3, 2, 1) is acceptable.

Since the resources of OWM are limited, the committee requests the aid of all interested parties in the development of these publications. The Scale Manufacturers Association has offered to help and is exploring the possibility of a research associate program for this endeavor.

(The foregoing item was adopted by voice vote.)

3. Utilities Type Water Meters.—The committee received a recommendation from the State of New Jersey that a code be developed for utilities type water meters since in some jurisdictions these devices are subject to weights and measures enforcement. It is the view of the committee that these devices should be subject to weights and measures regulation and it offers the following tentative code for Conference action. This tentative code is based on American Water Works Association Manual M6, Second Edition, which is already in force in the State of California.

Adequate time was not available for the development of a metric code. The committee will have prepared for the next annual Conference a code in metric units. In the meantime, the committee recommends that conversion from the U.S. Customary Units indicated in the code to metric units be applied to metric equipment.

1975
TENTATIVE CODE
WATER METERS

(This Tentative Code has only a trial or experimental status and is not intended to be rigidly enforced. The requirements are designed for observation and study prior to the development and final adoption of a Code for Water Meters.)

A. APPLICATION

A.1.—This code applies to devices used for the measurement of water, generally applicable to, but not limited to, utilities type meters installed in homes or business establishments and meters installed in batching systems.

A.2.—This code does not apply to water meters mounted on vehicle tanks (for which see Code for Liquid Measuring Devices).

A.3.—See also General Code requirements.

S. SPECIFICATIONS

S.1. Design of Indicating and Recording Elements and of Recorded Representations.

S.1.1. Primary Elements.

S.1.1.1. General.—A water meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

S.1.1.2. Units.—A water meter shall indicate and record, if the device is equipped to record, its deliveries in terms of gallons or cubic feet or binary or decimal subdivisions thereof except batch plant meters, which shall indicate deliveries in terms of gallons or decimal subdivisions of the gallon only.

S.1.1.3. Value of Smallest Unit.—The value of the smallest unit of indicated delivery and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

(a) 10 gallons on utility type meters,
(b) 1/10 gallon on batching meters delivering less than 100 GPM, or
(c) 1 gallon on batching meters delivering 100 GPM or more.

S.1.1.4. Advancement of Indicating and Recording Elements.—Primary indicating and recording elements shall be susceptible of advancement only by the mechanical operation of the device.

S.1.1.5. Return to Zero.—If the meter is so designed that the primary indicating elements are readily returnable to a definite zero indication, means shall be provided to prevent the return of these elements beyond their correct zero position.

S.1.2. Graduations.

S.1.2.1. Length.—Graduations shall be so varied in length that they may be conveniently read.

S.1.2.2. Width.—In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations, and the width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.008 inch in width.

S.1.2.3. Clear Interval Between Graduations.—The clear interval shall not be less than 0.04 inch. If the graduations are not parallel the measurement shall be made

(a) along the line of relative movement between the graduations and the end of the indicator, or
(b) if the indicator is continuous, at the point of widest separation of the graduations.

S.1.3. Indicators.

S.1.3.1. Symmetry.—The index of an indicator shall be symmetrical with respect to the graduations with which it is associated and at least throughout that portion of its length that is associated with the graduations.

S.1.3.2. Length.—The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 0.04 inch.

S.1.3.3. Width.—The width of the index of an indicator in relation to the series of graduations with which it is used shall not be greater than

(a) the width of the widest graduation, and
(b) the width of the minimum clear interval between graduations.

When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.

S.1.3.4. Clearance.—The clearance between the index of an indicator and the graduations shall in no case be more than 0.06 inch.

S.1.3.5. Parallax.—Parallax effects shall be reduced to the practicable minimum.

S.2. Design of Measuring Elements.

S.2.1. Provision for Sealing.—Adequate provision shall be made for applying security seals in such a manner that no adjustment may be made of

(a) any measurement elements, and
(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.

The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

S.2.2. Batching Meters Only.

S.2.2.1. Air Elimination.—Batching meters shall be equipped with an effective air eliminator.

S.2.2.2. Directional Flow Valves.—Valves intended to prevent reversal of flow shall be automatic in operation.

N. NOTES

N.1. Test Liquid.—A meter shall be tested with water.

N.2. Evaporation and Volume Change.—Care shall be exercised to reduce to a minimum, evaporation losses and volume changes resulting from changes in temperature of the test liquid.

N.3. Test Drafts.—Testing drafts should be equal to at least the amount delivered by the device in two minutes and in no case less than the amount delivered by the device in one minute at the actual maximum flow rate

developed by the installation. The test drafts shown in table 1 shall be followed as closely as possible.

N.4. Testing Procedures

N.4.1. Normal Tests.—The normal test of a meter shall be made at the maximum discharge rate developed by the installation.

N.4.2. Special Tests.—Special tests to develop the operating characteristics of meters may be made according to the rates and quantities shown in table 2, Section T.

N.4.3. Batching Meter Tests.—Tests on batching meters should be conducted at the maximum and intermediate rates only.

T. TOLERANCES

T.1. Tolerance Values.—Maintenance and acceptance tolerances shall be as shown in table 1 and table 2.

TABLE 1.

Meter size (inches)	Normal tests — Maximum rate			
	Rate of flow (GPM)	Meter indication		Tolerance on over- and under-registration
		Gal.	Ft³	
⅝	15	50	5	1.5%
¾	25	50	5	
1	40	100	10	
1½	80	300	40	
2	120	500	40	
3	250	500	50	
3	350	1000	100	
6	700	1000	100	

UR. USER REQUIREMENTS

UR.1. Batching Meters Only.

UR.1.1. Strainer.—A filter or strainer shall be provided if it is determined that the water contains excessive amounts of foreign material.

UR.1.2. Siphon Breaker.—An automatic siphon breaker or other effective means shall be installed in the discharge piping at the highest point of outlet, in no case below top of meter, to prevent siphoning of meter and permit rapid drainage of pipe or hose.

UR.1.3. Provisions for Testing.—Acceptable provisions for testing shall be incorporated into all meter systems. Such provisions shall include a two-way valve, or manifold valving, and a pipe or hose installed in the discharge line accessible to the proper positioning of the test measure. The valving, piping or hose shall not be smaller than the size of the actual discharge line.

TABLE 2.

Meter size (inches)	Special Tests							
	Intermediate rate				Minimum rate			
	Rate of flow (GPM)	Meter indication		Tolerance on over- and under-registration	Rate of flow (GPM)	Meter indication		Tolerance
		Gal.	Ft³			Gal.	Ft³	Under-registration / Over-registration
⅝	2	10	1	1.5%	¼	5	1	5.0% / 1.5%
¾	3	10	1		½	5	1	
1	4	10	1		¾	5	1	
1½	8	50	5		1½	10	1	
2	15	50	5		2	10	1	
3	20	50	5		4	10	1	
3	40	100	10		7	50	5	
	60	100	10		12	50	5	

DEFINITIONS OF TERMS

The terms defined here have a special and technical meaning when used in the Code for Water Meters.

batching meter. A device used for the purpose of measuring quantities of water to be used in a batching operation.

(The foregoing item was adopted by voice vote.)

FUTURE ITEMS

The committee wishes to inform the Conference that studies will commence or be continued on the following subjects:

(1) Code for Kilowatt Hour Meters
(2) Grain moisture meters
(3) The display of operating instructions
(4) Digital designs
(5) Closed fill systems

(The foregoing item was adopted by voice vote.)

The committee expresses its appreciation to all who have contributed to and participated in the committee deliberations. The committee urges all weights and measures officials and other affected parties to promptly communicate with the committee on all matters of concern. It is only in this manner that the committee can consider all problems and fully evaluate all situations prior to issuing its reports.

W. S. Watson, *Chairman*, California
J. R. Bird, New Jersey
W. E. Czaia, Minnesota
M. L. Kinlaw, North Carolina
K. J. Simila, Oregon
O. K. Warnlof, *Staff Assistant*, NBS
H. F. Wollin, *Exec. Secy.*, NCWM

Committee on Specifications and Tolerances

(Mr. Watson moved for adoption; and after a second from the floor, the report of the Committee on Specifications and Tolerances was adopted in its entirety by the Conference by voice vote.)

(On motion of the committee chairman, seconded from the floor, the Conference by voice vote authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

REPORT OF THE COMMITTEE ON LIAISON WITH THE FEDERAL GOVERNMENT

Presented by W. N. Seward, *Chairman*,
Assistant to the Senior Vice President for Industry Affairs,
American Petroleum Institute, Washington, D.C.

(Thursday, July 17, 1975)

The Committee on Liaison with the Federal Government submits its report to the 60th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by the final report.

The report represents recommendation of the committee formed on the basis of careful analysis of the interim meeting discussion and on the basis of written comments received during the year and oral presentations made during the open meeting of the committee. The committee intends to expand its communications with the Federal Government and to advocate the NCWM's interests before it.

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

Mr. W. E. Andrus, United States representative to the International Organization of Legal Metrology (OIML), requested clarification of the NCWM mechanism for review of OIML documents. This continuing activity is the main tool for introducing United States weights and measures philosophy and techniques into this international treaty organization.

The Liaison Committee recommends giving the National Measurement Policy and Coordination Committee the privilege of providing the U.S. Advisory Committee for International Legal Metrology, or its representative, a decision on the consistency of the international recommendations with respect to model laws and codes. The Liaison Committee reserves the prerogative of calling for voluntary ad hoc task groups from among all NCWM members and associate members to put before the appropriate standing committee of the Conference (Specifications and Tolerances, Laws and Regulations, Liaison) their individual task group opinions concerning the technical consistency of the international recommendations or drafts with respect to U.S. model laws and codes.

The judgment of the National Measurement Policy and Coordination Committee would be transmitted to the Conference's representative to the Advisory Committee for International Legal Metrology (ACILM) with the recommendation of how he should vote and what comments/conditions should be made known to the International Bureau of Legal Metrology (BIML). This judgment would not be binding on the NCWM until such time as the NCWM would take formal action on the National Measurement Policy and Coordination Committee report.

VOTING POLICY FOR OIML MODEL INTERNATIONAL RECOMMENDATIONS

There are two levels of voting on OIML recommendations. The first and lower level is nonbinding and only technical compatibility is at issue. The upper level is "morally binding" and should have clear criteria for an affirmative vote. (A vote approving the lower level—technical compatibility—does not commit the voter to approve the upper level vote.)

Positions on lower level ballots may be handled within the NCWM, without recourse to its National Measurement Policy and Coordinating Committee, based on sound technical judgment derived from its members and staff.

Positions on upper ballots will be cast only by the Conference on the recommendation of its National Measurement Policy and Coordinating Committee.

The criteria for the NCWM taking an affirmative position at the upper level are:

1. There exists an NCWM model code or handbook which is not in conflict with the OIML proposal.

2. While an NCWM model code or handbook does not exist, the National Measurement Policy and Coordinating Committee unanimously concurs that the OIML proposal is sufficiently beneficial to be adopted by the Conference.

3. Minor differences exist between existing NCWM model codes and/or handbooks and the OIML proposal; however, the NMPCC believes amendment(s) to existing domestic standards can be accomplished with a minimum of difficulty and economic dislocation.

REPORT OF NCWM REPRESENTATIVE TO OIML ADVISORY COMMITTEE

The year 1974 was a particularly important one for the United States in the OIML. First, top priority was given to ensuring U.S. participation in important technical committees in OIML. At pres-

ent, within OIML there are 30 technical committees (called pilot secretariats) and 141 subcommittees (called reporting secretariats) that are working to produce International Recommendations. The following is a breakdown of the number of secretariats chaired by the U.S. as compared with other major industrial nations.

	Technical Committees (Pilot Secretariats) Chaired	Subcommittees (Reporting Secretariats) Chaired
United States	6	13
France	4	14
West Germany	3	14
Japan	0	0
United Kingdom	1	5
U.S.S.R.	4	21
Total	18	67

Thus, five nations (excluding Japan) have control of 60 percent of the technical committees and 47 percent of the subcommittees. Of the 19 committees and subcommittees chaired by the U.S., 11 are of interest to the weights and measures community in that these 11 cover commercial weighing and measuring instruments.

The second area where major accomplishments by the U.S. are possible involves revision of OIML International Recommendations that were adopted prior to our membership in OIML. Nineteen such Recommendations were adopted in 1968 without technical input from the U.S. These Recommendations are up for revision in 1975. As a result, the U.S. embarked upon a major effort during 1974 to analyze the Recommendations and to propose revisions that will inject U.S. philosophy and practice. The purpose of such efforts is to remove technical barriers that result from nonuniform international requirements. The NBS Office of Weights and Measures participated in the analysis of the Recommendations, as did many other government agencies, industry trade associations, and private manufacturers of scientific and measuring instruments. The U.S. will negotiate with OIML during 1975 to actively seek revisions that are in our interest.

Lastly, during 1974, an ACILM was established and began to work closely with NBS on OIML matters. The ACILM is a cross section of government officials and industry representatives from organizations and/or associations who have an interest in OIML. The committee acts as an advisor to NBS in formulating U.S. positions and serves as the mechanism for: (1) ensuring adequate review and

analysis of technical documents; (2) identifying technical programs in OIML of interest to the U.S.; (3) identifying interest groups (industry or government) that should become involved in technical committees of OIML; and (4) recommending technical assignments to the various interest groups.

HANDBOOK 67

A draft for comment of the revision of NBS Handbook 67, "Checking Prepackaged Commodities," was distributed at the 60th National Conference on Weights and Measures. A number of concerned industry representatives who offered their help and advice on reviewing the draft have formed a committee under the auspices of the Industry Committee on Packaging and Labeling. It is hoped that this will encourage other concerned organizations and interests to form their own groups to review the draft.

It should be noted that a questionnaire is appended to the end of the draft to facilitate expression of suggestions and viewpoints. All comments, however, must be received before December 1, 1975, to enable collection of the responses in time for the interim meetings in January 1976. All comments should be mailed to:

Dr. Carroll S. Brickenkamp
Office of Weights and Measures
National Bureau of Standards
Washington, D.C. 20234

NET WEIGHT POLICY NEGOTIATIONS

NBS, as part of its task in revising Hankbook 67, has been meeting with representatives from the United States Department of Agriculture (USDA), the Food and Drug Administration (FDA), and the Federal Trade Commission (FTC) to determine if a set of national, uniform net weight requirements (including net weight definition, tare determination, sample size, retail checking requirements, etc.) are feasible among all the agencies which have jurisdiction over packaged goods. NBS is aware of the technical requirements which local retail and wholesale package checking must meet; but, as a nonregulatory agency, NBS is not able to convey the regulatory procedures and problems faced by state and local enforcement agencies except in a second-hand manner to the other Federal agencies. Therefore, the Liaison Committee encourages and invites state, county, and municipal regulatory representatives to attend and/or provide written or oral input to these negotiations. The Liaison Committee requests volunteers to act as a core group, with the purpose of giving typical views of state and local regulatory officials, to represent the NCWM at these ongoing negotiations.

IMPORTED PACKAGED COMMODITIES

The authority over the labeling of packaged commodities coming from other nations into the United States was investigated by the committee. U.S. border States have some difficulty tracing responsibility when packaging and labeling requirements are not met and the source of the package; that is, the responsible party, is unknown.

The United States Treasury Department's Bureau of Customs enforces other Federal agencies' regulations in this matter; therefore, USDA, FDA, and FTC, which have concurrent jurisdiction over certain items, were called upon during deliberations.

For those items over which FDA has concurrent jurisdiction (all non-meat foods including shellfish) FDA suggests contacting either the regional offices (whose addresses can be furnished upon request to the OWM, NBS) or the Commissioner for Compliance, FDA, Fishers Lane, Rockville, Maryland, directly. For those meat and poultry items over which USDA has concurrent jurisdiction, contact either their regional offices (addresses supplied upon request to OWM) or USDA–APHIS, Meat and Poultry Inspection Program, Washington, D.C. 20250. FTC enforces Section 5 items under FPLA through the Bureau of Customs. Contact for problems in this area is Mr. Earl Johnson, Bureau of Consumer Protection, FTC, 6th and Pennsylvania Ave., N.W., Washington, D.C. 20580.

It is recognized that many items have no Federal agency regulating them. However, the Bureau of Customs puts pressure on the importer or distributor in the same manner as the State. Therefore, this committee recommends that weights and measures enforcement officials explain to the retailers who buy imported packaged goods to:

1. Buy on consignment or a revocable letter of credit. If there is something wrong with the label, the importer is thus bound to fix it.
2. Get the distributor's name, so that there is a way to trace liability.
3. Check packaged goods to see if name and place of business, contents, and net quantity are all on the label.

STATE AND LOCAL MEASUREMENT SYSTEMS

Mr. Ralph Barra of NBS reported on opportunities for interaction of the States with NBS in areas other than weights and measures (mainly quality-of-life measurements using the NBS weights and measures mechanism of the NCWM as a model). This interaction needs, however, a central focus within the State for the many common measurement problems which individual State

agencies have. There are some experiments ongoing, notably in California, in which the State sets its own priorities and then channels its needs to NBS if necessary.

A discussion on measurement systems was held at NBS recently with Dr. J. Wyckoff, also from NBS, and Mr. Barra, focusing on measurement-intensive agencies in a few states. Representatives from California, Connecticut, Kentucky, Maryland, and Pennsylvania attended. The following recommendations were the results of this meeting:

1. Since there is little knowledge in the states of ongoing activities at NBS, other than in weights and measures, a newsletter should be initiated from NBS to key people within each state whose agencies have physical measurement components. In weights and measures, this newsletter would go primarily to state offices and regional association newsletter editors.
2. Each state should be encouraged to study its own measurement system to improve that system and tie it in with the National Measurement System. Weights and measures officials can assume a major role in their own states.
3. California has formed a State Measurement Advisory Board, and this pilot program requires a closer look. The preliminary results were reported in San Diego at the 60th National Conference.

WEIGHTS AND MEASURES ISSUES WITH RESPECT TO MILITARY INSTALLATIONS

In view of the lack of uniformity upon military bases and facilities on the issue of retail stores' measuring devices and packages, and in light of the potential economic concern to the consumers who use these stores, the Liaison Committee will reopen discussions with the appropriate military officials on this subject.

W. N. Seward, *Chairman*, American Petroleum Institute
E. H. Stadolnik, Massachusetts
C. G. Gehringer, Pennsylvania Scale Company
L. D. Holloway, Idaho
J. Speer, Milk Industry Foundation
J. F. Lyles (ex officio), NCWM representation to ACILM
C. S. Brickenkamp, *Staff Assistant*, NBS
H. F. Wollin, *Exec. Secy.*, NCWM

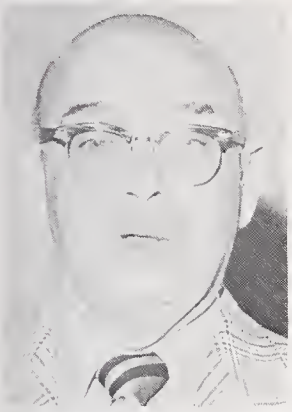
Committee on Liaison with the Federal Government

(Mr. Seward moved for adoption and, after a second from the floor, the report of the Committee on Liaison with the Federal Government was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON METRIC PLANNING

Presented by J. H. Lewis, *Chairman*
Chief, Weights and Measures Section, Department of Agriculture, State of Washington

(Thursday, July 17, 1975)



The Committee on Metric Planning submits its report to the 60th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by the final report. The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

Analysis of the work plan reported to the 59th National Conference on Weights and Measures resulted in the following recommendations for immediate NCWM action with respect to metric conversion.

1. The Specifications and Tolerances Committee should give high priority to the development of a metric Handbook 44. A mechanism which the Metric Planning Committee feels should be explored is the invitation to affected industries and trade associations to participate and submit first drafts of certain portions of the metric handbook. The Metric Planning Committee referred its knowledge of the availability of help from the Scale Manufacturers Association to the Specifications and Tolerances Committee.

2. The Laws and Regulations Committee should give high priority to the preparation of a Model Metric Labeling Guideline (which would include preferred units, symbols, placement of metric label, rounding off, decimal placement, etc.) using those portions of the "Model Metric Regulation" submitted at the 59th NCWM which are applicable.

3. The Education, Administration, and Consumer Affairs Committee should evaluate resources for preparation and distribution of metric educational material (including weights and measures training and public speaking kits).

The aforementioned recommendations were transmitted to the committees on the first day of the interim meetings.

The Metric Planning Committee also recommends the NCWM adopt the spelling of "metre" and "litre." These spellings correspond to SI units nomenclature. Another key advantage is the avoidance of confusion of the unit "metre" with the device "meter." It should also be noted that the most recent NBS policy statement also prefers this spelling (NBS Guidelines for Use of the Metric System, LC 1056, Nov. 1974).

The Metric Planning Committee recommends the National Conference on Weights and Measures accept the American National Metric Council's (ANMC) invitation to form a Weights and Measures Practices Sector Committee on the ANMC.

COMMITTEE ON NATIONAL MEASUREMENT POLICY AND COORDINATION

At the recommendation of the Committee on Metric Planning, whose tenure expires with the close of the 60th National Conference on Weights and Measures, a new standing committee of the Conference is proposed as set forth herewith. The new committee, to be known as the "Committee on National Measurement Policy and Coordination," will assume the responsibilities and objectives of the special committee that was established to deal with initial planning for metric conversion in the field of weights and measures in the United States. In addition, the new committee shall have responsibility for the establishment of policy and coordination of activities within the Conference on matters of national and international significance. Such matters will include: (a) metrication, (b) International Organization of Legal Metrology, and (c) other standards organizations—ANSI, ISO, ASTM, and NCSL. A major responsibility of this committee would be to delegate the organizing and/or establishing of work groups or task forces to meet the responsibility of the Conference towards standardization organizations, such as the establishment of the Weights and Measures Practices Sector Committee for the American National Metric Council.

In keeping with the spirit of this proposal, the OIML representative would report to the Committee on National Measurement Policy and Coordination. A further responsibility of the new committee will be to plan and coordinate matters of policy and activity among the other four standing committees of the NCWM—Specifications and Tolerances, Laws and Regulations, Education, and Liaison. For this reason, the committee chairman of each of these four committees will comprise the majority voting membership of the new committee. The fifth and one remaining voting member of the committee shall be appointed annually from the list of former chairmen of the NCWM who are still active in weights and measures regulatory service in their jurisdictions. This voting member

will serve as committee chairman and for a term not to exceed five years. During any given year, the current chairman of the NCWM will serve as an *ex officio* member of the committee. Special advisors and consultants will be called upon to serve the committee as the need arises.

To implement the establishment of this new committee, the following changes to the Conference Organization and Procedure are proposed:

1. Page 2: Objectives

Amend this section by adding a new (b) and reletter as follows:

"1. Objectives

The objectives of the National Conference on Weights and Measures are (a) to provide a national forum for the discussion of all questions related to weights and measures administration as carried on by regulatory officers of the States, Commonwealths, Territories, and Possessions of the United States, their political subdivisions, and the District of Columbia; (b) to provide a mechanism to establish policy and coordinate activities within the Conference on matters of national and international significance; (c) to develop a consensus on model weights and measures laws and regulations, specifications and tolerances for commercially-used weighing and measuring devices, and testing, enforcement, and administrative procedures; (d) to encourage and promote uniformity of requirements and methods among weights and measures jurisdictions; and (e) to foster cooperation among weights and measures officers themselves and between them and all of the many manufacturing, industrial, business, and consumer interests affected by their official activities."

2. Page 5: Committees

Standing Committees.—Amend this section to read as follows:

"5. Committees

Standing Committees.—The standing committees are the Committee on National Measurement Policy and Coordination, the Committee on Specifications and Tolerances, the Committee on Laws and Regulations, the Committee on Education, Administration and Consumer Affairs, and the Committee on Liaison with the Federal Government. The membership of the Committee on National Measurement Policy and Coordination shall be comprised of the committee chairmen of the other four standing committees and a fifth member who shall be appointed annually by the Conference president from the list of former Conference chairmen who are still active in weights and measures regulatory service. This fifth member shall also serve as committee chairman and may be reappointed for a total term of office not to exceed five years.

The membership of the remaining standing committees shall have a normal complement of five members appointed by the president from the active membership (except that the members of the Committee on Liaison with the Federal Government may be appointed from the active or the associate membership) on a rotating basis for five-year terms (one new

member being appointed, and one old member retiring, each year). When it is necessary to make an appointment to any of the five standing committees to fill a vacancy caused by the death, resignation, or retirement from active service of a committee member, the appointment shall be for the unexpired portion of such member's term. Except as noted, each standing committee annually selects one of its members to serve as its chairman. At his option, the president may designate one or more advisory or associate members as consultants to a standing committee."

3. Page 8: Following the paragraph on "Executive Committee" add the following:

Committee on National Measurement Policy and Coordination.—The Committee on National Measurement Policy and Coordination annually presents a report to the Conference on its activities. Its policies and coordinating efforts are subject to Conference ratification. The objective of this committee is to serve as a policymaking and coordinating body in matters of national and international significance which may include such areas as metrication, International Organization of Legal Metrology (OIML), American National Standards Institute (ANSI), International Standards Organization (ISO), American Society for Testing and Materials (ASTM), National Conference on Standards Laboratories (NCSL), and such internal matters as may be required.

J. H. Lewis, *Chairman*, Washington
C. G. Gehringer, Pennsylvania Scale Company
L. D. Holloway, Idaho
G. L. Johnson, Kentucky
G. E. Mattimoe, Hawaii
A. Sanders, Scale Manufacturers Association
W. N. Seward, American Petroleum Institute
J. Speer, Milk Industry Foundation
E. H. Stadolnik, Massachusetts
J. F. Lyles *(ex officio)*, NCWM representative to ACILM
C. S. Brickenkamp, *Staff Assistant*, NBS
H. F. Wollin, *Exec. Secy.*, NCWM

Committee on Metric Planning

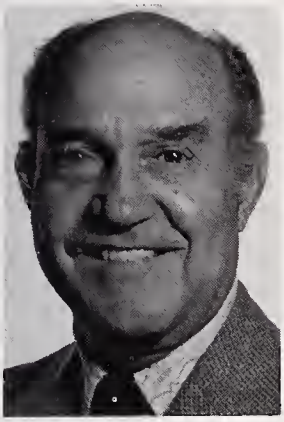
(Mr. Lewis moved for adoption and, after a second from the floor, the report of the Committee on Metric Planning was adopted in its entirety by the Conference by voice vote.)

REPORTS OF ANNUAL COMMITTEES

REPORT OF THE EXECUTIVE COMMITTEE

Presented by S. D. Andrews, *Chairman*,
Director, Division of Standards, Department of Agriculture and Consumer Services, State of Florida

(Wednesday, July 16, 1975)



The Executive Committee of the National Conference on Weights and Measures (NCWM) met in open session on Monday, July 14, at 1:00 p.m. The following particulars were presented for consideration and action by this Conference.

1. Plans for the 61st National Conference

The plan and general arrangements for the 61st National Conference on Weights and Measures were reviewed and include the following:

Site:	Washington, D.C.
Dates:	July 11–16, 1976
Hotel:	Shoreham Americana Hotel
Rates:	Single—$24, Double—$30, Suites—$60 and up
Special Arrangements to Celebrate:	(a) Bicentennial (b) NBS 75th Anniversary

The committee recommends to the incoming Executive Committee that they proceed with special arrangements to celebrate Bicentennial year and the NBS 75th Anniversary.

Program Format: The committee recommends that the basic program outline for the 61st Conference be similar to the general format that was followed for this Conference meeting. However, there may be slight deviation from this year's program because of special events occurring in 1976.

The committee recommends further that the incoming Executive Committee give consideration to the following items in developing its plans for the 61st NCWM:

(a) Extend the Conference meeting to include sessions on Friday to allow for a more comprehensive program.
(b) Hold sessions at the National Bureau of Standards which would include a tour of the Bureau facilities.
(c) Expand the social activities to include a luncheon or banquet to which members of Congress, top government officials, and other dignitaries would be invited.

Registration Fee: To meet the added costs involved in the conduct of an expanded program during the 61st NCWM, the Executive Committee recommends that the registration fee be increased to $50 for the Bicentennial year.

2. Future Conference Sites

Tentative Conference arrangements have been made for 1977 and 1978.

62nd NCWM:	
Site:	Dallas, Texas
Dates:	July 17–22, 1977
Hotel:	The Statler Hilton Hotel
Rates:	Single—$25, Double—$30, Suites—$50 and up
63rd NCWM:	
Site:	Washington, D.C.
Dates:	July 9–14, 1978
Hotel:	Shoreham Americana

3. Interim Committee Meetings

In recognition of the importance of the NCWM interim committee meetings, the Executive Committee wishes to establish the practice of announcing during the Conference annual meeting the dates and other arrangements of the interim meetings for the year ahead. Accordingly, arrangements for the 1976 interim committee meetings will be as follows:

Site:	National Bureau of Standards Gaithersburg, Maryland
Dates:	January 26–30, 1976
Committees:	All NCWM standing committees
Purpose:	To consider and develop tentative reports on: (a) All matters carried over from the previous Conference. (b) New proposals. (c) Problems that the committees feel require attention.
Attendance:	Government officials, industry representatives, and consumers may attend the interim meetings to appear before a committee on a matter of concern to them. Such appearance is scheduled on the basis of a written request to the executive secretary.
Communications:	All persons who wish to communicate proposals, suggestions, or other items for committee consideration must do so in writing. These communications must be received by the executive secretary no later than January 15.

4. Committee on Metric Planning

A special Committee on Metric Planning was established as a result of action which occurred during the interim committee meetings last year. The committee consists of the members of the Committee on Liaison with the Federal Government and, in addition, G. Johnson, Kentucky; J. Lewis, Washington; and G. Mattimoe, Hawaii. The committee has served for a period of two years.

The Executive Committee has been briefed on the proposal by the Committee on Metric Planning, which will be a part of that Metric Committee report to establish a new standing committee to carry on responsibilities in the area of policy and coordination within the framework of the Conference. The Executive Committee endorses this proposal and recommends the implementation by the incoming Executive Committee.

5. Report of the Associate Membership Committee

As is a customary procedure, the Executive Committee called on the Associate Membership Committee for its report. The following report was presented by Mr. Richard Southers, committee chairman.

The Associate Membership Committee was formed for the purpose of providing a means for associate members to contribute to overall success of the Conference. Although this contribution to date has been principally in the form of sponsorship of a social function, this is not the basic reason for the committee's organization.

Associate members who would like to make suggestions about the Conference or its organization may not feel there is a means provided to have their ideas considered. Therefore, the Associate Membership Committee affords these individuals a means of conveying their ideas and suggestions and also encourages its members to avail themselves of this communication vehicle.

The committee met with the executive secretary of the Conference at the time of the interim meetings to discuss the role of the Associate Membership Committee at this Conference. A reception has been arranged for Tuesday night between 5:30 and 7:30 p.m., which we hope will be enjoyed by all. Such receptions are meant to provide a time and place where all Conference attendees can get together in a social atmosphere and become better acquainted.

Please let us know if you have any suggestions on how this committee can help to better serve the aims of the National Conference on Weights and Measures.

6. The committee would like to encourage active members of the Conference to send in their suggestions as to program speakers, topics, schedules, activities, and other related matters to the executive secretary so that such suggestions may be considered by the Executive Committee in the development of the program for next year.

S. D. Andrews, *Chairman*, Florida
J. G. Gustafson, Minneapolis, Minnesota
E. Prideaux, Colorado
H. D. Robinson, Maine
H. E. Sandel, San Bernardino County, California
C. C. Morgan, Gary, Indiana
J. H. Lewis, Washington
C. P. Conrad, New Jersey
J. A. Etzkorn, South Dakota
E. Hanish, LaPorte County, Indiana
W. B. Harper, Birmingham, Alabama
F. D. Morgan, Utah
P. E. Nichols, Alameda County, California

L. P. Romano, Monroe County, New York
R. F. Schulmeister, New Mexico
R. A. Tharalson, Minnesota
E. Whitesides, Texas
H. F. Wollin, *Exec. Secy.*, NCWM

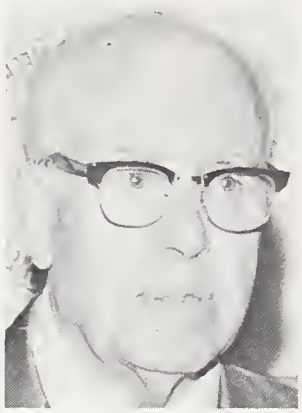
Executive Committee

(Mr. Andrews moved for adoption and, after a second from the floor, the report of the Eexecutive Committee was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON NOMINATIONS

Presented by Everett H. Black, *Chairman*,
Administrator, Consumer Protection Agency,
Ventura County, California

(Thursday, July 17, 1975)



The Committee on Nominations met on Wednesday, July 16, for the purpose of selecting a slate of nominees for all elective offices and for the ten elective memberships of the Executive Committee. In the selection of nominees from the active membership, consideration was given to attendance records, geographical distribution, Conference participation, and other factors deemed by the committee to be important.

The Committee on Nominations submits the following names in nomination for office to serve during the ensuing year and at the 61st National Conference on Weights and Measures:

Chairman: R. L. Thompson, Maryland

Vice Chairmen: L. A. Gredy, Indiana; E. Keeley, Delaware; P. E. Nichols, Alameda County, California; D. I. Offner, St. Louis, Missouri

Treasurer: C. C. Morgan, Gary, Indiana

Chaplain: J. H. Lewis, Washington

Executive Committee: E. W. Ballentine, South Carolina; F. L. Brugh, Indianapolis, Indiana; H. W. Chandler, Yolo County, California; A. W. Fenger, Minnesota; S. F. Hindsman, Arkansas; G. E. Mattimoe, Hawaii; J. B. Rabb, Alabama; W. C. Sullivan, Seattle, Washington; M. Trujillo, Puerto Rico; W. Tusen, New Hampshire

E. H. Black, *Chairman*, Ventura County, California
G. L. Johnson, Kentucky
E. Keeley, Delaware
J. H. Lewis, Washington
C. C. Morgan, Gary, Indiana
H. E. Sandel, San Bernardino County, California
C. Wooten, Florida

Committee on Nominations

(There being no further nominations from the floor, nominations were declared closed, and the officers nominated by the committee were elected unanimously by voice vote.)

REPORT OF THE COMMITTEE ON RESOLUTIONS

Presented by JOHN M. CHOHAMIN, *Chairman*; Superintendent, Weights and Measures, Middlesex County, New Jersey

(Thursday, July 17, 1975)

The Committee on Resolutions wishes to extend appreciation of the 60th National Conference on Weights and Measures to each and everyone who has contributed in any way toward its success. A special note of thanks goes to the following:

1. To Mr. Charles A. Barrett, Chief Deputy Attorney General for the State of California, for his very relevant presentation which defines "weights and measures."

2. To Dr. F. Karl Willenbrock, Director of the Institute for Applied Technology, National Bureau of Standards, Washington, D.C., for his innovative address and his recognition of the importance of preparing for metrication in America and for participation in the awards ceremony.

3. To Mr. L. T. Wallace, Director of the California Department of Food and Agriculture, for his fine presentation and recognition of the importance of having standards for measurement; and through him to the State of California, our expressed appreciation for being a gracious host State to the 60th National Conference on Weights and Measures.

4. To the Conference host, City of San Diego, and its weights and measures officials for their great assistance in the preparations for this Conference.

5. To the management and staff of the Sheraton-Harbor Island Hotel for their fine facilities and numerous courtesies which contributed to the comfort and enjoyment of delegates.

6. To all speakers of the Conference for their valuable and informative contributions to the program.

7. To the representatives of business, industry, and consumer organizations for their liberal cooperation and hospitality.

8. To the National Bureau of Standards, and in particular the staff of the Office of Weights and Measures, for planning and diligently administering the many details involved in the work and program of the Conference.

9. To all officers, appointed officials, and committee members of the 60th National Conference on Weights and Measures for their valu-

able service and contributions to the functioning of an orderly and successful Conference program.

The following resolutions are presented in their entirety for consideration of the members of the Conference:

Resolution on the Spelling of Metric Units

Whereas certain handbooks, model codes, and other materials of the National Conference on Weights and Measures include increasing reference to the metric system of units (SI); and

Whereas the Conference has endorsed the position taken by the Committee on Education, Administration, and Consumer Affairs: Therefore be it

Resolved, That the National Conference on Weights and Measures hereby adopts the spelling "metre" and "litre" for immediate use.

Removal of All Barriers to the Adoption and Use of the International System of Units (SI)

Whereas the United States of America is moving toward the implementation of the International System of Units (SI) of weights and measures; and

Whereas the use of the International System of Units (SI) in all agency publications and in the adoption of policy by your agency encouraging the use of the SI System are excellent avenues for associative learning of the SI System; and

Whereas government departments and agencies on all levels can render a vital service of education by encouraging use of both systems in (for example) labeling, statistical reporting, blueprints, and engineering: Therefore be it

Resolved, That the National Conference on Weights and Measures strongly recommends that all barriers be removed to securing appropriate modification of laws, statutes, regulations, ordinances, and policies to provide and secure the equality of the International System of Units (SI) with the customary system of weights and measures and to allow and make legal the International System of Units (SI) for all matters in which it is in the best national interest.

Resolution Requesting Necessary Support for the Office of Weights and Measures to Carry Out Their Expanded Responsibilities for Metric Services

Whereas the National Bureau of Standards, through the Office of Weights and Measures, is the governmental entity entrusted with the task of providing advice, training, and support activities to Federal, State, and local agencies in the measurement area; and

Whereas technical advances in industry have increased the measurement responsibilities of the Federal and State agencies; and

Whereas the consumer businesses and government are turning to the National Bureau of Standards for advice at an increasing rate; and

Whereas an informal changeover to the modernized metric system (SI) is tking place in the United States and a formal, planned change may be adopted in the near future; and

Whereas the Office of Weights and Measures of the National Bureau of Standards does not have the resources to perform adequately to meet the demands for their services reqeusted by Federal, State, and local agencies: Therefore be it

Resolved, That the National Conference on Weights and Measures request that Congress through the appropriate committees appropriate an adequate level of funding to the Office of Weights and Measures of the National Bureau of Standards so that it can continue and expand its services to meet the increasing demand for services related to the use of the modernized metric system (SI).

Guidelines for Point of Sale Systems

Whereas new procedures and systems at points of sale have appeared rapidly in the retail markets throughout the Nation; and

Whereas no provisions have been uniformly established nationwide to provide type approval, methods of use, and inspection; and

Whereas such conditions are contrary to the aims, objectives, and policies of the National Conference on Weights and Measures; and

Whereas the National Conference on Weights and Measures believes that such sale systems and all components thereof rightfully are examples of the measurement devices used in commerce today, and should therefore be under the complete jurisdiction of weights and measures enforcement agencies: Therefore be it

Resolved, That the appropriate committees be requested to establish guidelines for approval and use of such point of sale systems and all component parts thereof.

Net Declaration of Contents of Gift Packages

Whereas there is sufficient evidence of the continuing sale of gift package commodities without the required net declaration of content statement; and

Whereas there is evidence also of the sale of gift package commodities with estimated net decalaration of content; and

Whereas this problem appears to be nationwide in violation of existing packaging regulations: Therefore be it

Resolved, That the National Conference on Weights and Measures strongly advise and recommend to the heads of the state departments of weights and measures that immediate steps be taken to insure that all such packaged commodities offered for sale bear the net declaration of contents.

Resolution on the Adoption of the Model State Method of Sale of Commodities Regulation

Whereas uniformity in the method of sale of commodities is an important goal of the National Conference on Weights and Measures; and

Whereas the Model State Method of Sale of Commodities Regulation is an important guideline for securing uniformity; and

Whereas the Model State Method of Sale of Commodities Regulation is expanding in importance and will continue to expand at a rapid rate to cover the sale of many additional commodities; and

Whereas many commodities lack a uniform method of sale and lack uniformity in enforcement because of uneven adoption of the Model; and

Whereas adoption of the Model State Method of Sale of Commodities Regulation by the states should proceed at a more rapid pace: Therefore be it

Resolved, That the National Conference on Weights and Measures recommend that member jurisdictions that have not yet adopted the Model State

Method of Sale of Commodities Regulation seek with all due speed to have their jurisdictions taken appropriate action.

J. M. Chohamin, *Chairman*, Middlesex County, New Jersey
J. W. Jones, Riverside County, California
W. C. Sullivan, Seattle, Washington

Committee on Resolutions

(On motion of the committee chairman, seconded from the floor, the report of the Committee on Resolutions was adopted by voice vote.)

REPORT OF THE AUDITING COMMITTEE

Presented by R. W. Probst, *Chairman*
Director, Bureau of Standards
Wisconsin Department of Agriculture

(Thursday, July 17, 1975)

The Auditing Committee met on Wednesday, July 16, for the purpose of reviewing the financial records of the Conference treasurer, Mr. C. C. Morgan. The committee finds these records to be in accordance with Conference procedure and correct.

R. W. Probst, *Chairman*, Wisconsin
D. L. Lynch, Kansas City, Kansas
S. R. Miller, San Diego, County, California

Committee on Auditing

(On motion of the committee chairman, seconded from the floor, the report of the Auditing Committee was adopted by voice vote.)

REPORT OF THE TREASURER

Presented by C. C. Morgan, Sealer of Weights and Measures, Gary, Indiana

(Thursday, July 17, 1975)

Balance on hand July 1, 1974		$ 4,388.23
RECEIPTS:		
Registrations (381 at $30.00)	$11,430.00	
Beverage Refund	44.05	
		$11,474.05
		$15,862.28
DISBURSEMENTS:		
Atwood Transport Lines, Inc.	$ 216.00	
NAMF Tour Guide	27.50	
Creative Signs	275.00	
The Shoreham Hotel Master Account	1,711.88	
Howard Devon, Musical Service	585.00	
Franklin Press, Letterhead	27.40	
Louise Young, Speaker Expense	197.88	
Registration Desk and Miscellaneous Conference Expenses	578.13	
Sydney Andrews, Letterhead (Chairman)	24.96	
Visual Aids, Electronic Corp.	194.00	
Chicago Decal Co.	504.20	
Franklin Press, Registration Receipts	76.40	

January Interim Meetings:		
Conference Chairman	316.47	
Committee on Specifications and Tolerances	1,828.02	
Committee on Laws and Regulations	1,221.93	
Committee on Education, Administration, and Consumer Affairs	1,714.93	
Committee on Liaison with the Federal Government	900.69	
Committee on Metric Planning	1,617.03	
Operating Expenses, Local Travel, Motel Hospitality Room, Reception, and Miscellaneous Charges	311.80	
Weights and Measures Signs, Empire Room (Cash)	15.75	
Bank Service Charge	7.19	
		$12,352.16
Balance on hand July 1, 1975		$ 3,510.12
Medallion Income		$12,555.50

DISBURSEMENTS:

Franklin Mint	$ 1,500.00	
Franklin Mint	2,257.92	
Franklin Mint	2,231.45	
		5,989.37
Medallion Balance		$ 6,566.13
Conference Balance		3,510.12
Balance		$10,076.25

Bank Balance	$10,053.75
Cash on Hand	22.50
	$10,076.25

Depository: Bank of Indiana

(Signed) C. C. Morgan, *Treasurer*

(On motion of the treasurer, seconded from the floor, the Report of the Treasurer was adopted by the Conference.)

PERSONS ATTENDING THE CONFERENCE

State, City, and County Weights and Measures Officials

ALABAMA

State ---------- JOHN B. RABB, Metrologist, Weights and Measures, Department of Agriculture & Industries, P.O. Box 3336, Montgomery 36109 (Tel. 205: 832-6766)

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ARIZONA

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HENRY C. TANNER, Supervisor, Weights and Measures Division

JOHN M. WOODBURY, Investigator, Weights and Measures Division

KENNETH B. HALLOCK, Investigator II, Weights and Measures Division

ARKANSAS

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CALIFORNIA

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Dick Vizzard, Senior Inspector
Lewis R. Chapman, Inspector
Mark H. Hanson, Inspector
Chris S. Lavagnino, Inspector
Eugene K. Lucas, Inspector

Calaveras
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Contra Consta
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Wayne E. Poe, Senior Deputy
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Larry H. Miller, Deputy
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	WILLIAM H. HOLLAND, Inspector of Weights and Measures
	ROBERT K. MCNERLIN, Inspector of Weights and Measures
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	GAIL K. KORPORAAL
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	W. W. SHARPE, Deputy Sealer
	BARRY C. LAME, Inspector of Weights and Measures
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DELAWARE

State ---------- EUGENE KEELEY, Supervisor of Weights and Measures, Department of Agriculture, Drawer D, Dover 19901 (Tel. 302: 678-4824)

FLORIDA

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IDAHO

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Chicago 60602 ---------- JOHN F. SURANE, Deputy Commissioner, Department of Consumer Sales, Weights and Measures, 121 N. LaSalle Street, Room 808, City Hall (Tel. 312: 744-4007)
CAROL WITHERELL, Program Analyst (Tel. 312: 744-4092)
FERNANDO A. OLIVARES, Consumer Service Officer

INDIANA

State ---------- LORENZO A. GREDY, Director, Division of Weights and Measures, State Board of Health, 1330 W. Michigan Street, Indianapolis 46206 (Tel. 317: 633-6860)

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IOWA

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City Weights and Measures Officials:

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KENTUCKY

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Ronald C. Egnew, Laboratory .Supervisor

LOUISIANA

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MAINE

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Clayton F. Davis, Director, Division of Inspections

MARYLAND

State ---------- Richard L. Thompson, Chief, Weights and Measures, Division of Inspection and Regulation, Department of Agriculture, Room 3205, Symons Hall, College Park 20742 (Tel. 301: 454-3551)

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Baltimore 21202 ---------- Thomas A. Considine, Chief, Division of Tests, Department of Public Works, 1103 Municipal Bldg. (Tel. 301: 396-3457)

MASSACHUSETTS

City Weights and Measures Officials:

Agawam 01001 ---------- Louis D. Draghetti, Inspector of Weights and Measures, 36 Main Street (Tel. 413: 786-0400, Ext. 51)

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State ---------- Ronald M. Leach, Chief, Food Inspection Division, Department of Agriculture, Lewis Cass Bldg., 5th Floor, Lansing 48913 (Tel. 517: 373-1060)

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Arvid W. Fenger, Inspector

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MISSOURI

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ROBERT D. WITTENBERGER, Program Supervisor, Scale (Tel. 314: 751-3440 or 751-4992)
ROBERT C. PARKS, Program Supervisor, Petroleum Section (Tel. 314: 751-4993)

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MONTANA

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NEVADA

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FRANK W. JONES, Inspector of Weights and Measures

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Cape May — A. DAVID GIDDING, Superintendent of Weights and Measures, 6807 Seaview Avenue, Wildwood Crest 08260 (Tel. 609: 522-4861)

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Joseph Silvestro, Assistant Superintendent

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NEW MEXICO

State ---------- Dr. Charles H. Greene, Chief, Division of Markets, Weights & Measures, Department of Agriculture, P.O. Box 3170, Las Cruces 88003 (Tel. 505: 646-1616)
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OREGON

State ---------- Kendrick J. Simila, Director, Weights and Measures Division, Department of Agriculture, Agriculture Bldg., Salem 97310 (Tel. 503: 378-3792)

Max O. Burns, Supervisor, Standards Laboratory

PENNSYLVANIA

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